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CHINA SEA PILOT
VOL. III

COMPRISING
THE COASTS OF CHINA AND MANCHURIA
FROM FOKAI POINT TO THE ŌRYOKU KŌ;
THE NORTHERN COAST OF LUZON; FORMOSA;
AND THE WESTERN COAST OF KOREA

FIRST EDITION
1937

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CAUTION WHEN APPROACHING BRITISH PORTS.

(To be inserted inside cover of all Sailing Directions.)

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PART I.—CLOSING OF PORTS.

(1) My Lords Commissioners of the Admiralty having taken into consideration the fact that it may be necessary to forbid all entrance to certain ports of the Empire, this is to give Notice that on approaching the shores of the British Isles, or any of the ports or localities of the British Empire, a sharp lookout should be kept for the signals described in the following paragraph, and for the vessels mentioned in paragraph (5), Part II, of this Notice, and the distinguishing and other signals made by them. In the event of such signals being displayed, the port or locality should be approached with great caution, as it may be apprehended that obstructions may exist.

(2) If entrance to a port is prohibited, three *red* lights vertically disposed by night, or three *red* balls vertically disposed by day, will be exhibited in some conspicuous position in or near to its approach, which signals will also be shown by the vessels indicated in paragraph (5), Part II, of this Notice.

If these signals are displayed, vessels must approach the port with the greatest caution, and implicitly obey all orders or signals given them by the Examination vessel or Signal station.

(3) At some ports or localities at home or abroad, searchlights are occasionally exhibited for exercise. Instructions have been given to avoid directing moveable searchlights during practice on to vessels under way, but mariners are warned that great care should be taken to keep a sharp lookout for the signals indicated in paragraph (2) above, when searchlights are observed to be working.

PART II.—EXAMINATION SERVICE.

(4) In certain circumstances, it is also necessary to take special measures to examine vessels desiring to enter the ports or localities at home or abroad.

(5) In such case, vessels carrying the distinguishing flags or lights mentioned in paragraph (7) will be charged with the duty of examining ships which desire to enter the port and of allotting positions in which they shall anchor. If Government vessels, or vessels belonging to the local port authority, are found patrolling in the offing, merchant vessels are advised to communicate with such vessels with a view to obtaining information as to the course on which they should approach the port. Such communication will not be necessary in cases where the pilot on board has already received this information from the local authorities.

(6) As the institution of the Examination Service will probably be unknown to vessels desiring to enter the port, especial care should be taken in approaching the ports, by day or night, to keep a sharp lookout for any vessel carrying the flags or lights mentioned in paragraph (7), and to be ready to " bring to " at once when hailed by her or warned by the firing of a gun or sound rocket.

In approaching by night any port in the British Empire, serious delay and risk will be avoided if four efficient all round lanterns, two *red* and two *white*, are kept available for use.

(7) By day the distinguishing flag of the Examination Steamer will be a special flag (white and red horizontal surrounded by a blue border).

Also, three *red* balls vertically disposed if entrance is prohibited.

Usually the Examination Steamers will fly the blue ensign, but in certain circumstances they may fly the white ensign.

By night the steamer will carry : (*a*) Three *red* lights vertically disposed if entrance is prohibited ; (*b*) three *white* lights vertically disposed if entrance is permitted.

The above lights will be carried in addition to the ordinary navigation lights, and will show an unbroken light around the horizon.

(8) Merchant vessels approaching a British port, at which the Examination Service is in force, must hoist their signal letters on arriving within visual signalling distance and are not to wait for the signal " What ship is that ? " to be made from the Examination Steamer.

(9) Masters are warned that, before attempting to enter any port when the Examination Service is in force, they must in their own interests strictly obey all instructions given to them by the Examination Steamer.

Whilst at anchor in the Examination Anchorage, Masters are warned that it is forbidden, except for the purpose of avoiding accident, to do any of the following things, without permission from the Examination Officer :—(*a*)To lower any boat ; (*b*) to communicate with the shore or other ships ; (*c*) to move the ship ; (*d*) to work cables ; (*e*) to allow any person or thing to leave the ship.

(10) In case of fog, Masters of vessels are enjoined to use the utmost care, and the port should be approached with caution.

(11) When the Examination Service is in force, merchant vessels when approaching ports are especially cautioned against making use of private signals of any description, either by day or night ; the use of them will render a vessel liable to be fired on.

(12) The pilots attached to the ports will be acquainted with the regulations to be followed.

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(To face Cautionary Notice in all Sailing Directions.)

NOTATIONS OF SUPPLEMENTS AND ANNUAL SUMMARIES OF NOTICES TO MARINERS RELATING TO THIS BOOK.

To be filled in by Navigating Officer.

[In Chart Depôts the first two columns are alone to be filled up.]

Title.	Date of Publication and Number.	Whether pasted in or noted in Margins of Book, and Date of each Correction.

CAUTION.

Attention is called to British Admiralty Notices to Mariners Nos. 7 and 10, which are published annually.

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NOTICE.

This volume should not be used without reference to the latest Supplement and Annual Summary of Notices to Mariners affecting it which may have been published.

A Supplement to this volume will generally be published annually until the latter is again taken up for revision.

After the publication of Supplement No. 1, each succeeding supplement cancels the former.

Between the time of the volume being taken up for revision and the publication of the new edition no supplement will be issued, but early in each year a Summary of the Admiralty Notices to Mariners affecting the volume, which have been published during the preceding year, will be issued as a separate publication.

The publication of all Supplements and Summaries of Notices to Mariners is announced in Admiralty Notices to Mariners.

The latest Supplement and any Annual Summary of Notices to Mariners that has been published affecting this volume will be obtainable gratuitously by purchasers of this volume from the Admiralty Agent or Sub-Agents for the sale of charts, on application either personally or by letter. In the latter case the cost of postage must be enclosed.

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CHINA SEA PILOT

VOL. III

COMPRISING

THE COASTS OF CHINA AND MANCHURIA FROM FOKAI POINT TO THE ŌRYOKU KŌ; THE NORTHERN COAST OF LUZON; FORMOSA; AND THE WESTERN COAST OF KOREA

FIRST EDITION, 1937

ALL BEARINGS ARE TRUE

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PUBLISHED for the HYDROGRAPHIC DEPARTMENT, ADMIRALTY
By HIS MAJESTY'S STATIONERY OFFICE

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1938

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To face page ii.]

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CAUTION.

IN THIS WORK THE BEARINGS ARE ALL TRUE, AND WHEN GIVEN IN DEGREES ARE RECKONED CLOCKWISE, FROM 000° (NORTH) TO 359°.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

THE LATITUDES AND LONGITUDES GIVEN IN THE TEXT ARE APPROXIMATE.

THE DISTANCES ARE EXPRESSED IN NAUTICAL MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO THE TENTH PART OF A NAUTICAL MILE.

THE DEPTHS ARE GIVEN BELOW CHART DATUM LEVEL WHERE NOT OTHERWISE STATED.

HEIGHTS ON THE LAND ARE GIVEN ABOVE MEAN LEVEL OF HIGH WATER SPRING TIDES.

FIGURES IN BRACKETS GIVEN AFTER THOSE DENOTING FEET, FATHOMS AND YARDS ARE THEIR EQUIVALENTS IN METRES.

TIME IS EXPRESSED IN THE FOUR-FIGURE NOTATION COMMENCING AT MIDNIGHT.

THE TERM "STEAM VESSEL" USED HEREIN INCLUDES ANY VESSEL PROPELLED BY MACHINERY.

WHEN SHADING IS USED TO INDICATE COLOURS OF FLAGS, TIDAL LIGHT SIGNALS, OR BEACONS, IT IS AS FOLLOWS:

Yellow.

Red.

Blue.

Green.

Black.

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ADVERTISEMENT TO THE FIRST EDITION.

The China Sea Pilot, Volume III, contains a description of the coasts of China and Manchuria from Fokai point, 40 miles northeastward of Hong Kong, to the Ōryoku kō; the northern coast of Luzon; Formosa; and the western coast of Korea.

The description of the above area was formerly contained in the China Sea Pilot, Volume V, which was originally published in 1912, a second edition following in 1926.

This, the first edition of the China Sea Pilot, Volume III, has been prepared by Commander I. Mackenzie, R.N., from the publications issued by the Chinese, Japanese and United States Governments, and from the latest information received in the Hydrographic Department.

The Meteorological information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, speed in knots, and distance in nautical miles unless expressly stated otherwise. Information received from meteorological services which do not use these units has been converted into the units mentioned above by the Meteorological office.

Mariners and others are invited in the interests of navigation to forward to the Hydrographer, Admiralty, London, S.W.1, any information that may come under their notice, which would be useful for the correction of the charts and other hydrographic publications issued by the British Admiralty; *early* advice as to newly-discovered dangers, the establishment of, or changes in, any aids to navigation, is specially requested.

Copies of a form (H. 102), on which to render information, can be obtained *gratis* from the Admiralty chart agent:—

MR. J. D. POTTER,
154, Minories, London, E.C.3,

or of any of his sub-agents in Great Britain and abroad, a list of whom will be found at the end of all books published for the Hydrographic Department.

By the publication of this volume, the second edition of China Sea Pilot, Vol. V, 1926, and Supplement No. 7, 1935, are cancelled, and all information affecting that work contained in Notices to Mariners, up to and including No. 2269 of 1937, has been embodied in this volume; for temporary and preliminary Notices to Mariners affecting this edition, the list of temporary and preliminary Notices to Mariners in force, published monthly in the weekly edition of the Admiralty Notices to Mariners, should be consulted.

J. A. EDGELL,
Rear-Admiral,
Hydrographer of the Navy.

Hydrographic Department,
Admiralty, London,
3rd December, 1937.

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BIBLIOGRAPHY.

The following works, other than British Government publications, have been consulted in the preparation of this edition :—

China Year Book, 1936.

Report of the Marine Department, 1935, published by the Maritime Customs of China.

China Coasters' Tide Book and Nautical Pocket Manual, 1937.

Chinese Admiralty List of Lights and Fog signals, 1935.

Chinese Admiralty List of Buoys and Beacons, 1935.

List of Lighthouses, Light-vessels, Buoys, Beacons, etc. on the Coast and Rivers of China, 1937, published by the Maritime Customs of China.

The Coastwise Lights of China, published in 1932 by order of the Inspector General of Customs, Shanghai.

Japan-Manchoukuo Year Book, 1936.

United States Coast Pilot, Phillipine islands, Part I, 2nd Edition, 1927, with Supplement dated 1935, has been used for the description of the north coast of Luzon, and the Babuyan and Batan islands.

Taiwan Nansei Shotō Engan Suiroshi, 1932, with Supplement No. 4, 1937, has been used for the description of Formosa and the Pescadores islands.

Chōsen Engan Suiroshi, Vol. II, 1934, with Supplement No. 2, 1937, has been used for the description of the western coast of Korea.

Shina Tōgan Suiroshi, Vol. II, 1931, with Supplement dated 1934, has been used for the description of the Kwantung peninsula.

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GLOSSARY

CHINESE—ENGLISH

Chinese	English	Chinese	English
Ai – –	A saddle between hills	Kiang – –	River
An – –	Shore, coast	Kiang-kou –	Estuary or mouth of river
		Kou – –	Ditch
Cha – –	Barrier, dam	Ku-kou –	Gorge
Chen, Cheng	Town or city		
Chi – –	Ledges (in river)	Lan – –	Blue
Chi-tuan –	Tide rips	Li – –	Gravel, shingle; inside
Chia – –	Cape		
Chiang – –	Harbour or channel	Lieh-tao –	Islands
Chiao – –	Rocks or reefs, cape or point, bridge	Ling – –	Chain of hills or mountains
Chien – –	Ravine	Liu – –	Stream, current
Chien-tan –	Shoal		
Ching – –	Capital	Men – –	Gate, pass
Chow – –	Island	Miao – –	Temple
Chuang –	Village	Mu – –	A wood
Chung-yuan	Mainland		
		Nan – –	South
Feng – –	Peak	Nei – –	Inner
Fu – –	District city of the first order, commercial town	Ni – –	Mud
		Pa – –	Embankment, dyke, breakwater
Hai – –	Sea	Pai – –	White
Hai-wan –	Gulf	Pan-tao –	Peninsula
Hei – –	Black	Pei – –	North
Ho – –	River, creek	Ping-mien –	Level
Hsi – –	West	Pu – –	Town
Hsia – –	Lower		
Hsiang –	Village, country	Sha – –	Sand, sandbank
Hsiao – –	Small	Sha-tsui –	Sandy spit
Hsien – –	District	Shan – –	Hill, mountain; island
Hsin – –	New	Shan hu –	Coral
Hsuan –	Eddies, whirlpool	Shan-hu-chiao	Coral reef
Hu – –	Lake, reservoir	Shan-tien –	Summit
Huang –	Yellow	Shang – –	Upper
Hung – –	Red	Shao – –	Small
		Shen – –	Province
Kang – –	Ridge, mound	Shen-lin –	Forest
Kan – –	Dry	Shih – –	City; rock, stone
Kao – –	High	Shu – –	Tree
Kao-yuan –	Plateau	Shuan-sha –	Bar

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Chinese	English	Chinese	English
Ta – – –	Pagoda; great	Wa – – –	Swamp, swampy
Tan – – –	Bank, flat	Wai – – –	Outer
Tang – – –	Pond, embankment	Wan – – –	Bay, bend
Tao – – –	Island, islet		
Ting – – –	Top	Yai – – –	Bluff, cliff
Tou – – –	Headland	Yeh-yin – –	Camp
Tsui – –	Cape, point, spit	Yen – – –	Reef, rock
Tuan – – –	Rapids	Yu – – –	Islet
Tung – –	East		

JAPANESE—ENGLISH

Japanese	English	Japanese	English
Bi – – –	Cape	Minami – –	South
Byōchi – –	Anchorage	Misaki – –	Cape or point
		Mura – –	Village
Chō – – –	Town: ward		
		Nada – – –	Sea; inlet
Dai – – –	Large	Nan – – –	South
Dashi – – –	Island, islet; reaching out, commonly used for shoal	Nishi – –	West
		Ō, Ōkii – –	Great; large
Dō – – –	Province	Oki – – –	Offing
Fu – – –	City	Rettō – – –	Chain or group of islands
Gai – – –	Town	Ri – – –	Town; village
Gan – – –	Rock		
Guntō – – –	Island group	Sai – – –	West
		Saki – – –	Cape; point
Haku – – –	White	Sammyaku – –	Mountain range
Hakuchi – –	Roadstead	San – – –	Mountain
Hana – – –	Cape	Satai – – –	Sandbank
Hantō – –	Peninsula	Se – – –	Shoal
Hatoba – –	Landing place; wharf	Sei – – –	West
		Sen – – –	River
Higashi – –	East	Sendan – –	Bank
Ho – – –	Bay	Sentai – – –	Shoal bank
Hō – – –	Peak	Shi – – –	Point
Hoku – – –	North	Shima, Sima –	Island
		Shiwo, Siwo –	Tide; current
Iso – – –	Rock	Sho – – –	Islet; rock; level (used for town in Formosa)
Iwa – – –	Rock		
Ka – – –	River	Shō – – –	Reef; small
Kai – – –	Sea	Shotō – –	Large island group
Kaikyō – –	Strait	Shu, su – –	Shoal, bank
Kaku – – –	Cape; point	Shu – – –	Province
Kan – – –	Skewer (used for cape)	So – – –	Villa
		Son – – –	Village
Kawa – –	River	Suidō – – –	Channel
Kei – – –	Valley; rivulet		
Kita – – –	North	Tai – – –	Large
Kō – –	Harbour; river; entrance	Take – – –	Peak
		Tan – – –	Point (extremity)
Kuchi – – –	Mouth of river	Tashi – – –	Island, islet
Kurai, Kuro –	Black	Tō – – –	Island, east
Kyō – – –	Capital city	Wan – – –	Bay
Machi – –	Street; town		
Matsu – – –	Point; extremity	Yama – – –	Mountain

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FORMOSAN—ENGLISH

Formosan	English	Formosan	English
Kan – – –	Harbour	Sū – – –	Islet
Namu – – –	South	Taa – – –	Rock; reef
Paku – –	North; white	Toa – – –	Large
Pii – – –	Cape	Tsun – – –	Town

KOREAN—ENGLISH

Korean	English	Korean	English
Am, Amu – –	Rock, or rock which dries	Nyo – – –	Small islet
Dogu – – –	Village; valley	Paui – – –	Rock
Kagu – – –	River	Pyon – – –	Plain
Kaye – – –	Bay	Togu – –	Village; Valley
Ma – – –	Cape, point	Yon – – –	Peak

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SYSTEM OF ORTHOGRAPHY

The following rules for the spelling of geographical names (termed the R.G.S. II system) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the Index.

The rules for spelling in the R.G.S. II system are as follows :—

(1) The spelling of every place-name in an independent country or self-governing dominion using the Latin alphabet (including " Latin " alphabets containing extra or modified letters, such as Czesch, Serb-Croat, Polish, Romanian, etc.) shall be that adopted by the country or dominion, except in the case in which certain important localities have also in addition to the official name, another customary name, notably different, in which case the name customary in British use (*i.e.* " conventional ") may be adopted (*e.g.* Geneva, Warsaw, etc. for Genève, Warszawa, etc.).

(2) In colonial possessions the spelling of such place-names as belong to languages coming under Rule (1) will be spelt in accordance with that rule ; but native names (African, Oceanic, etc.) come under Rule (4).

(3) The accents and diacritical marks in official use by the above countries will be retained. Wherever it appears desirable the pronunciation will be shown by giving the name as transliterated on the system below.

(4) All other place-names throughout the world will (with the exception of " Conventional " names and some others) be spelled in general accordance with the following system.

The broad features of this system are—

(*a*) That vowels are pronounced as in Italian and consonants as in English ;

(*b*) That every letter is pronounced, and no redundant letters are used.

This system aims at giving a close approximation to the *local* pronunciation ; but it is recognised that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

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TABLE OF SPELLING AND PRONUNCIATION R.G.S. II.

a	Long and short Italian vowels, as in *Lāvā*	Somāli; Rāvennā.*
á	Between *a* in *fat* and *e* in *eh*; rare; chiefly in Teutonic and Finno-Ugrian languages	Mähring; Pärnu.
ai†	The two Italian vowels, frequently diphthongal, as in *aisle*	Wadai: Shanghai.
au	The two Italian vowels; frequently diphthongal, almost as *ou* in *out*	Sakau; Bauchi.
aw	When followed by a consonant, or when terminal, as in *awl, law*	Dawna; Saginaw.
b	As in English.	
c	Not to be used, but always replaced by *k* or *s*; except in the compound *ch*, and in many conventionally-spelt words, as	Kandahar; Serang Calcutta; Celébes.
ch	As in *church*; never *tch* or *tsch* for this sound ..	Chad; Kerch.
d†‡	As in English.	
dh	Soft *th* as in *they*; a slight *d* sound sometimes preceding it in Semitic languages	Hadhramaut; Riyadh.
e†	Long as in *eh*? short as in *bet*. (For the *e* sound in the French *je*, see note at end on the "neutral vowel.")	Gēlo; Mafēking.*
(ee)	Used for *i* (*q.v.*) only in a few conventional names	Darjeeling; Keelung.
ei†	The two Italian vowels, frequently diphthongal as in *rein*..	Beirut; Raheita.
(eu)	Not used as a single sound.	
f	As in English; *ph* must not be used for this sound (except in Greek; see *ph*)	Mustafa; Maidan-i-Naftun
g	Hard as in *get, gift*; never as in *gem, gin*	Gedáref; Gilgit.
gh	Soft guttural, the Arabic *ghain*	Ghadames; Baghdad.
h	Used only when sounded; or in the compounds *ch, dh, gh, hh, sh, th, zh*	Ahmadabad; 'Abdullah.
i	Long as in *marine*; short as in *piano*	Fiji; Kĭbonde.*
j	As in English; except in transliteration of Russian, Bulgarian, and Chinese, where it equals *zh*, or the French *j*	Juba, Ujiji (Eng. *j*); but Jitómir, Jelezna, Jaoping (Fr. *j*).
k	As in English; hard *c* should never be used (except in conventionally-spelt words)—thus, not Corea, Cabul, but	Korea; Kabul.
kh	Hard aspirated guttural, as in the Scottish *loch* (not as in *lock*)	Khan; Sebkha.
l‡ **m** **n**‡	As in English.	

*The long and short symbols given here are merely for explanation, not for use.

†Pronounced differently in Greek. ‡See note at end on *Liquid sounds*.

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ng	Has three separate sounds, as in *vanguard*, *finger*, and *singer*. If necessary to distinguish, a hyphen may be placed, as in *van-guard*, *sing-er*	In-galla; Bongo; Ng-ami; Tong-a.
ngg	May be used for the sound of *ng* as in *finger* ..	Trengganu; Yanggang-a.
o	Long as in *both*¶: short as in *rotund*	Kigōma; Hōnōlulu.*
ŏ	As in German; equals the French *eu* in *peu*; or nearly the English sound in *fur*	Barkōl.
(oo)	Used for *u* (*q. v.*) only in a few conventional names, chiefly Indian and Chinese	Poona; Foochow.
oi†	The two Italian vowels; frequently diphthongal as in *oil*	Hanoi.
ŏi	The diphthong as in French *œil* and Norwegian *hŏi* ..	Hŏiland.
ou†	Dissyllabic, and not as French or English *ou* ..	Zlatoust; Yaroua.
ow	Used as a diphthongal combination of *ŏ* and *ŭ* only in the romanisation of Chinese. Conventional ..	Hankow.
p	As in English.	
ph	As in *loophole*; not to be used for the *f*-sound, except in Greek or conventionally	Chemulpho; Paphos; Haiphong.
q	Represents *only* the Arabic *qaf* and the Hebrew *qof*; *i.e.* a guttural *k* as a rule	Qeda; Qiryath.
qu	Should never be employed to represent the sound of *kw*; thus, not Namaqua, Quorra, but	Namakwa; Kworra.
r	As in English; should be distinctly pronounced.	
s	As English *ss* in *boss*, not as in *these* or *pleasure*	Burgos; Masikesi.
sch	As in *discharge*	Ruschuk.
sh **t**‡	} As in English.	
th	Hard *th* as in *thick*, not as in *this* (except conventionally in Fijian)	'Athlith; Thingvellir.
u	Long as in *rude*, or as *oo* in *boot*; short as in *pull* ..	Zūlū; Rūanda.*
ŭ	As in German: equals the French *u*, as in *tu* (Fr.)	Üskŭdar.
v **w** **x**	} As in English.	
y†	Always a consonant, as in *yard*; it should not be used as a terminal vowel, *e* or *i* being substituted; *e.g.* not Kwaly or Wady, but	Kikuyu; Maya. Kwale; Wadi.
z	As in *gaze*, not as in *azure*.	
zh	As the *s* in *treasure*, the *z* in *azure*, or the French *j* in *je*; but for the sound in Russian, Bulgarian, and Chinese use *j* (*vide* note about under *j*) ..	Zhob.

* The long and short symbols given here are merely for explanation, not for use.
† Pronounced differently in Greek. ‡ See note at end on *Liquid sounds*

¶ The true Italian ŏ is broader than this; almost as in *broth* (= R.G.S. II *aw*). The letter *o* is conventionally used for this sound in certain names in Nigeria, Tonga, etc.: *e.g.* Oyo, Fofoa.

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NOTES.

The doubling of a vowel or a consonant is only necessary when there is a distinct repetition of the single sound, and should otherwise be avoided	Nuusafee; Moorea; Jidda; Muhammad.
Accents should not generally be employed; but in order to indicate or emphasise the stress, an acute accent may be used	Saráwak; Qántara; Tong-atábu; Paraná.
A long or short mark over a vowel (*e.g.* ā, ŏ) should only be used (and that sparingly) when without it there would be danger of mispronunciation* ..	Kūt; Kyōto; Abōeo.
Hyphens will not be used except to indicate pronunciation and with the particle -i- (in Persian, Fijian, etc.)	Ta-if; Pusht-i-Kuh; Nuku-i-Ra.

Inverted Comma and Apostrophe.—The inverted comma ' is employed only to represent the Arabic *'ain* and the Hebrew *'ayin*. The apostrophe ' in foreign words indicates a liquid sound (see below).

Liquid Sounds.—The occasional "liquid" or "palatalised" sound of *d*, *l*, *n*, *s*, *t*, etc. (as in *d'you*, *lure*, *new*, *pursue*, *tune*, etc.) is as a rule sufficiently represented by a following *y*; where, however, owing to a following consonant, or to the letter in question coming at the end of a word, the *y* is inapplicable, the liquid sound will be represented by an apostrophe, thus: *d'*, *l'*, *n'*, *s'*, *t'*, etc.

The "Neutral Vowel."—The "indeterminate" or "neutral" vowel sound (*ər*), i.e. the sound of *a* in *marine*, *e* in *often*, *i* in *stir*, *io* in *nation*, *o* in *connect*, *ous* in *curious*, *u* in *difficult*, etc., *e* in French *je*, or the often unwritten vowel (*Fat-ha*) in Arabic, etc., is represented as a rule by *a*: as in Basra, Hawiya; but sometimes by *e*, when the sound approximates more to *e* than to *a*: as Meshed, El Gezira.

The sound must not be confused with *e-mute*, where the *e* is not sounded at all: as in Abbeville.

Nasal Vowels.—In illustrating the pronunciation of French, Portuguese, Polish, etc., nasal vowels, the nasalisation will be represented by italic *n*: as Częstochowa pr. Chānstokhóva.

Note.—With reference to rule (4) it may be remarked that in the case of native names in countries under the dominion of other Powers, in whose map, charts, etc., the spelling is given in accordance with a system other than the R.G.S. II system, that the spelling of such native names in British publications may differ from the local spelling. Thus, the island in the Dutch East Indies east of Java is spelt Madoera in Dutch publications, but, in British publications, Madura.

The Royal Geographical Society has published a book entitled "Alphabets of Foreign Languages transcribed into English according to the R.G.S. II system." This book enables the correct rendering of such names as are referred to in the last paragraph to be obtained, also of names in languages which are transliterated letter for letter.

*ē and ō are conventionally used to represent the Greek ēta (η) and ōmega (ω); Kythēra, Kōs.

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INFORMATION RELATING TO ADMIRALTY CHARTS AND OTHER HYDROGRAPHIC PUBLICATIONS AND GENERAL NAVIGATION

ON THE CORRECTION OF ADMIRALTY CHARTS SAILING DIRECTIONS, ETC.

Guides to Navigation. In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the sailing directions, the list of lights, fog signals and visual time signals, and the list of wireless signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications.

CHARTS.

1. **Degree of Reliance.**—While the Admiralty charts can be relied upon to be correct for all information received, it should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on "The Use of Charts as Navigational Aids, etc,", which are included in the introductory portion of each volume of Admiralty Sailing Directions, should be carefully studied in this connection.

2. **System of Dating and Issue of Corrected Copies.**—Admiralty charts after (*a*) first publication, are kept corrected by means of (*b*) new editions, (*c*) large corrections, and (*d*) small corrections. Copies of charts issued by the Admiralty Chart Establishment, Chart Agency or Admiralty chart depôts are corrected except from temporary and preliminary Notices to Mariners (see paragraph 3*h*), for all navigational information to the date of issue.

(*a*) *New charts.*—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g. :—

Published at the Admiralty 30th May, 1925.

(*b*) *New Editions.*—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g. :— *New Edition 2nd Jany., 1926.*

All large and small corrections notations are at the same time erased, and all copies of the charts are cancelled.

(*c*) *Large Corrections.*—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g. :— *Large Corrections 10th Feb., 1927.*

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All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

(*d*) *Small Corrections.*—

(*i*) When a chart is corrected from information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary notices—see paragraph 3*h*), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart e.g. :—

Small Corrections 1928-*903*-

Copies of the chart in stock in the Admiralty Chart Establishment, Chart Agency and the Admiralty chart depôts are corrected by hand from such information.

(*ii*) When a chart is corrected from information which is considered of no importance from the standpoint of safe navigation, and which is, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction are entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence with the notations referred to in the preceding paragraph, e.g. :—

Small Corrections, 1928—[5.20]—

or Small Corrections 1928—(VI.*25*)

These indicate that the chart received minor corrections on the 20th May or 25th June, respectively.

In such cases copies of the chart held by ships and Establishments are not usually replaced by new copies, but in exceptional cases, e.g., when new compasses are inserted, new copies of the charts may be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart does not invalidate it for navigation.

3. Correction of Charts in Ships, etc.

(*a*) *General Instructions.*—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary notices (see paragraph 3*h*), should at once be neatly made in waterproof red ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof red ink, in the bottom left-hand corner of the chart as shown in paragraph 2*d* (i). The recognised abbreviations shown on Admiralty chart No. 5011 ("Signs and abbreviations used on Admiralty Charts") should be used.

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown.

(*b*) *On Large Scale Charts* the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, depth of water on bars or in shifting channels, and irregularities of lights, should be inserted.

(*c*) *On Coastal Charts* the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted.

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Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz. :—

(i) Elevation, (ii) Period, (iii) Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart.

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted.

(*d*) *On Ocean Charts* lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

(*e*) *Insertion of Writing, etc.*—Writing should be inserted as much as possible clear of the water, unless the relative objects are on the water, and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, etc., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details.

(*f*) *Erasures* should never be made but the details should, when necessary, be crossed through in waterproof red ink.

(*g*) *Blocks.*—Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as "blocks"), and when correcting charts from such blocks the following points should be borne in mind :—

(i) A block not only shows corrections in red *but may also cancel existing work on the chart.* The latter would, however, invariably be mentioned in the text of the notice, and the fact that a block accompanies a notice should not cause the text of the notice to be disregarded.

(ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration.

(iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the notice.

(iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the blocks while it is dry and making two or three pencil ticks round the edges for use as fitting marks after the paste is applied.

(*h*) *Corrections from temporary or preliminary notices* should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g. :—N.M. $\frac{142}{1938}$ temp., and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (see paragraph 2*d*). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made.

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Charts in stock in the Admiralty Chart Establishment, Chart Agency and the Admiralty chart depôts are *not* corrected from temporary or preliminary Notices to Mariners, and when charts are received from one of these sources they should be corrected in pencil as necessary from the copies of such notices already held, or from those supplied with the charts.

(*j*) *Corrections from Wireless Navigational Warnings* concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports, &c., should also be noted in *pencil*, as received, on the charts affected. Wireless navigational warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

(*k*) Corrections from information received from authorities other than the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS.

4. (*a*) **Admiralty Sailing Directions,** consisting of about 70 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty charts for the area which were published when the volume was printed.

Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be kept corrected. It should, however, be clearly understood that Sailing Directions cannot be correct in all minor details after the date of the latest Supplement.

The above mentioned corrections are not made in the Sailing Directions stocked in the Admiralty Chart Establishment, Chart Agency or the Admiralty chart depôts.

(*b*) *A new edition* of each volume of Sailing Directions is published at intervals of approximately ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the "Advertisements" on page iii of each volume, and the numbers of the notices affecting it between the dates of going to press and issue to ships and establishments are given in the notice announcing its publication, to enable the new edition to be corrected before being brought into use.

(*c*) *Supplements and Summaries of Notices to Mariners.*—A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing Directions, and these notations are made as necessary in all copies issued by the Admiralty Chart Establishment and the Admiralty chart depôts.

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(*d*) *Corrections from Supplements and Summaries of Notices.*—Supplements and Summaries of Notices should either be retained intact for reference, notations referring to them being made on the pages of the Sailing Directions affected, or they should be cut up, the slips being pasted in the Sailing Directions at the appropriate places. Whichever of these alternatives is adopted, the tabular form on the front fly-leaf of the volume should be noted accordingly.

(*e*) *Correction from Notices to Mariners.*—A copy of each notice affecting the Sailing Directions should be pasted into them in its appropriate place as soon as the charts (see paragraph 3) and other publications affected have been corrected.

5. **The Admiralty List of Lights, Fog Signals and Visual Time Signals** for the world is issued in nine volumes divided geographically as shown on the index chart at the beginning of all volumes.

Light-buoys are not included in the list.

The volumes are published at intervals of three years, corrected to the 31st December, and in the intervals, Supplements to each volume embodying all corrections to the 31st December are published annually, the second Supplement in each case cancelling the first. Important amendments to the Admiralty List of Lights are notified in Admiralty Notices to Mariners, and minor amendments in section III of the weekly editions of these notices. (This section III also includes the important amendments.)

The List should be corrected for amendments published in Section III of the complete weekly edition of the Admiralty Notices to Mariners, either in red ink or by pasting in slips, cut from the section.

Temporary and Preliminary Notices should be noted *in pencil.*

Supplements to the List are not to be cut up; a label, for affixing to the appropriate Part of the List, is issued to draw attention to the existence of a Supplement.

These corrections are not made, however, in copies of the volumes stocked in the Admiralty Chart Establishment, Chart Agency or the Admiralty chart depôts, and copies received from these sources should accordingly be corrected from the supplements (if any) and weekly editions of notices before being brought into use.

6. **The Admiralty List of Wireless Signals** is issued in two parts. Volume I includes details of W/T stations, direction finding stations, fog signals, weather bulletins, storm signals, navigational warnings, time signal stations, &c., whilst Volume II contains regulations, details of codes, list of observation stations, &c., of a permanent or quasi-permanent character. Each volume is corrected to the 31st December, new editions of Volume I being published annually and of Volume II at intervals of approximately five years.

A Supplement to each volume is published annually. The Supplement to Volume I contains corrections between the dates of the volume going to press and of its issue to Ships and Establishments. The Supplement to Volume II embodies all corrections issued up to the end of the previous year, each succeeding Supplement cancelling the former.

Corrections to the list are promulgated in Section IV of the weekly editions of the Admiralty Notices to Mariners. Important corrections are also included in Section II.

Copies of the List stocked in the Admiralty Chart Establishment,

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Chart Agency or the Admiralty chart depôts are not kept corrected, and Lists received from these sources should accordingly be corrected from the Supplements and from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

7. **The Admiralty Tide Tables** are published in two editions, standard and abridged. The standard edition embraces the whole world, and the abridged edition covers European waters, the Mediterranean sea, and the west coast of Africa north of Cape Palmas. Each edition consists of three parts published separately, as follows :—

Part I, published annually, contains tidal predictions for Standard ports.

Part II, published at intervals of about five years, contains non-harmonic tidal constants, tidal differences and harmonic tidal constants for the principal ports, &c. Supplements to this part are published as required.

Part III, contains instructions for predicting tides and tidal streams, and for analysing observations ; and tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

1. *Reliance on a Chart.*—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart. To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of Coast sheets, which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published. It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines ; that each time the lead descends, or a sonic sounding is taken the depth over only a small area is obtained, in the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast, which vessels only pass in

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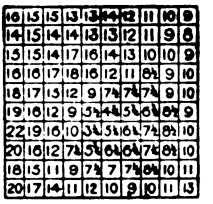
proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor, are made on a scale of three inches to the mile, and surveys of frequented ports, or harbours likely to be used by Fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large scale Coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper :—



Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear weather, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may occasionally escape detection.

Lines of soundings plotted as close as may be practicable on a scale of 6 inches to the mile would be 100 feet apart, and each line would be only 2 inches in actual width.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection; whilst in a chart on a scale of 6-inches, inequalities as large as battle-ships, if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General Coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the contour line of 10 fathoms, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part. Better results can, however, be obtained by sonic sounding owing to the rapidity with which such soundings can be taken, but, even this method will not find rocks unless the boat or vessel be directly over them.

Blank spaces among soundings mean that no soundings have

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been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion.

2. *Fathom Lines a Caution.*—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special precautions.

The ten-fathom line, is on rocky shores, as before mentioned, another warning, especially for ships of heavy draught.

Charts where no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed round, as there is no knowing how closely the spot may have been examined.

3. *Chart on largest scale always to be used.*—It sometimes happens that from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason, besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

4. *Caution in using Small Scale Charts.*—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. This is particularly to be observed when coming to an anchor on a narrow ledge of convenient depth at some distance from the shore.

For the same reason bearings to objects near should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

5. *Graduation.*—All Plans are now being graduated in skeleton style before publication in order to facilitate easy reference to Astronomical positions; previously published plans are also graduated as opportunity offers. The graduation is, however, of necessity, often based upon imperfect information of a conflicting nature; for this reason, whenever an Astronomical position is quoted other than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such

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as a point of land or a light, &c., and not by the graduation which may differ owing to one of the charts being constructed on later and more complete astronomical data than the other.

6. *Distortion of Printed Charts.*—The paper on which charts are printed is, from various causes, subjected to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

7. *Buoys.*—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them and not by buoys.

Light-buoys.—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British islands are from 5 to 217 candle power.

Cable-buoys.—Cable-buoys marking the ends of submarine cables usually are spherical or can shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights placed horizontally.

8. *Lights.*—Circles drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height, at the beginning of each part of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles, if of any power. (*See* table in Light List before mentioned.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

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On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

9. *Fog signals.*—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind:—

(*a*) Fog signals are heard at greatly varying distances.

(*b*) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones one of the notes may be inaudible.

(*c*) There are occasionally areas around a fog signal in which it is wholly inaudible.

(*d*) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.

(*e*) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.

Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected.* Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal; as experience shows that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

The attention of Mariners is also called to the serious dangers which may arise from the misuse of wireless fog signals. No attempt should be made to approach such a signal on a wireless bearing, at the same time relying on hearing the sound fog signal. These wireless fog signals are sometimes transmitted from light-vessels, and, in order to avoid collision, it is essential that the bearing from these signals should not remain constant.

10. *Tides.*—In navigating coasts where the tidal range is considerable, caution is always necessary. It should be remembered that there are indraughts to all bays and bights, although the general run of the stream may be parallel to the shore.

The turn of the tidal stream offshore is seldom coincident with the time of high and low water on the shore. In open channels, the tidal stream ordinarily overruns the turn of the vertical movement of the tide by about three hours, forming what is usually known as tide and half-tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

The tidal predictions given in Part I of the Tide Tables can generally be relied upon to give the times of high and low water within a few minutes and the heights within a few tenths of a foot; times and heights at Secondary ports, found by means of the tidal differences given in Part II, are considerably less exact than those predicted in the tables for Standard ports; times and heights found from the tidal constants may be considerably in error and must always be used with caution, particularly in waters where diurnal inequality is great.

In crossing a bar or shallow flats, the tables for finding the height

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of the tide at times between high and low water, given in the Tide Tables may be found of great assistance in calculating how much the water has risen or fallen at any hour of the tide. Heights of tide obtained from these tables must not, however, be implicitly relied on, for they depend on assumptions which are not always correct in practice.

The datums used on the charts of different nations vary considerably. That adopted for the Admiralty charts founded on surveys carried out by the surveying vessels of the Royal Navy is, in waters where the diurnal inequality is small, the level of mean low water springs, and in waters where the diurnal tides are considerable, the level of Indian spring low water.

As, however, a very long series of tidal observations is required before either of these levels can be definitely determined, and as the chart datum depends, in most cases, on a few weeks' observations only, the datum adopted must always be considered as approximate, and differs, in most cases, considerably from the theoretical datum.

Where Admiralty charts are founded on the charts of other nations, the datum is that used by the original authority. This may be mean low water springs (Denmark, Norway, Germany, Japan, &c.), mean low water (U.S. Atlantic coast, &c.), mean low water (U.S. Pacific coast, Philippines, &c.), or the lowest possible low water (France, Spain, &c.) All these datums must be considered as approximate only.

It should be remembered that the tide may fall below datum, except in cases where the lowest possible low water has been used as datum. In waters where diurnal inequality is small the lowest tides usually occur when the moon is near perigee and near the equator at springs, or at about the equinoxes, where diurnal inequality is great the lowest tides usually occur when both the moon and sun are in high declination at springs or at about the solstices. Wind or a high barometer may also reduce the height of the tide and cause it to fall below datum.

Caution.—From the above remarks it will be seen that the depths shown on Admiralty charts are not always the least depths that will be found to exist, due to the fact that the level of the chart datum is, in most cases, above the level to which the tide may fall.

11. ***Tidal Streams.***—Information on the charts regarding tidal streams is generally given in tabular form or notes, at a convenient place, with symbols referring to the information at the position for which it is given; in certain cases arrows are used to indicate the streams.

Tidal streams, particularly if rotary, may vary considerably both in direction and rate; streams computed from the information given must, therefore, always be considered approximate.

12. ***Fixing position.***—The most accurate method of fixing a position relative to the shore is by angles between well-defined objects on the chart. All ships are supplied with a station-pointer, and this method should be used whenever possible.

Two things are, however, necessary to its successful employment: First, that the objects be well chosen; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer.

For the former, reference can be made to the pamphlet on the use of the station-pointer, or to the Admiralty Manual of Navigation; the latter is only to be obtained by practice.

It will readily be seen that a sextant offers great advantages, as angles can be obtained from any position whence the objects are visible.

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In many narrow waters also, where the objects may yet be at some distance, as in coral harbours, or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

It is not intended that the use of the compass to fix the ship should be given up: there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. In all cases where great accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal, or of additions to a chart of fresh soundings or new buildings. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. In the case of ordinary soundings, it is only necessary to take a third angle now and then; firstly to check the general accuracy of the chart, as above stated; secondly, to make certain that the more important soundings, as at the end of a line, are correctly placed.

Sometimes, when only two objects are visible, a compass bearing and sextant angle may be used with advantage.

In passing near a point of land, or an island, the method of fixing by doubling the angle on the bow is often most useful. This method is as follows:—

Suppose that the angle between the ship's head and an object is measured, and found to be X°, and that the time of the observation is noted. Suppose also that the time is again taken when the angle between the ship's head and the object is 2X°. Then, if the course made good is the course steered, the distance of the ship from the object at the time the second bearing was taken is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object.

The most useful form of this method, the so-called "four-point bearing," gives an excellent fix for a departure, but does not ensure safety, as the point and any dangers that may lie off it are abeam before the position is obtained.

By taking the bearings when the object is two points and four points on the bow, a very good position is obtained before the object is passed: the distance from the object when the second bearing is taken being, as before, equal to the distance run in the interval over the ground. This, however, is only true if the current is directly with or against the course of the ship. If a cross current or leeway has to be allowed for, the results by this method may be altogether erroneous and misleading. In such a case, therefore, the method should be discarded, and the ship's position determined by plotting the two bearings and the estimated course and distance made good in the interval, in the usual manner.

A table, "Distance of an object by two bearings," is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the time of the second bearing can be found by using any two bearings and the run between them; but this, like the method of doubling the angle, should not be employed when the vessel is subject to a cross current or leeway.

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The use of a danger angle in passing outlying rocks with land behind should also not be forgotten. In employing this method, however, caution is necessary, as should the chart be not accurate, i.e., should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not therefore, be employed when the survey is old or manifestly imperfect.

In fixing by the compass, it must always be remembered that two bearings only are liable to error. An absolute error may be made in either bearing observed; errors may be made in applying the deviation; or errors may creep in in laying them on to the chart. For these reasons, a third or check bearing of some other object should be taken, especially when near the shore or dangers. The coincidence of these three lines will prevent any mistakes.

Amongst astronomical methods of fixing a ship's position, attention is drawn to the great utility of Sumner's method. A Sumner line, that is, a line drawn through the position (obtained by an assumed latitude or longitude) at right angles to the bearing of a heavenly body, as obtained from azimuth tables, &c., gives at times invaluable information, as the ship must be somewhere on that line, provided the chronometer is correct. A sounding at the same time may often serve to give an approximate position on the line. An early and very accurate position can also be obtained by Sumner's method, by getting a Sumner line by a bright star at daylight when the horizon is well visible, and another Sumner line by the sun when a few degrees above the horizon, or, better still, by observing two or more stars at twilight. The Sumner lines thus obtained will, if the bearings of the bodies differ three points or more, give an excellent result.

13. *Change of Variation of the Compass.*—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles, and in the English Channel about 5° in 400 miles. The Variation Chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation Chart. One or two *isogonic lines* are also sometimes placed on charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses.

14. *Local Magnetic Disturbances of the Compass on board Ship.*—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the com-

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pass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together.

They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

15. *Use of Oil for Modifying the Effect of Breaking Waves.*—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows :—

1. On free waves, i.e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances ; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use ; crude petroleum is serviceable when nothing else is obtainable ; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be : hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow—e.g., from the cathead—and allowed to tow in the water.

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With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat which would follow with a bag towing astern, would appear to be the best plan. As before remarked under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

16. *Concise Rules for Revolving Storms*:—

1. Revolving storms are so named because the wind in these storms revolves round an area of low pressure situated in the centre. They have also local names, and are termed hurricanes in the West Indies, and South Pacific Ocean; cyclones in the Indian Ocean, Bay of Bengal, and Arabian Sea; and typhoons in the China Sea.

2. In these storms the wind always revolves the same way in the same part of the world, that is, against the movement of the hands of a watch in the northern hemisphere, and with the hands of a watch in the southern hemisphere. The wind does not revolve in circles, but has a spiral movement, inwards, towards the centre.

3. Revolving storms have also, as a general rule, a progressive movement. Within the tropics they usually move from east to west at first, and then curve towards the pole of the hemisphere in which the storm is generated, and afterwards move from west to east.

4. The track which the centre of the storm takes is called the path of the storm, and the portion of the storm-field on the right of the path is known as the right-hand semicircle, and that on the left as the left-hand semicircle of the storm.

5. In the right-hand semicircle, if the observer be stationary, the wind will always shift to the right, and in the left hand semicircle to the left. This law holds good in both hemispheres.

6. If a vessel be so situated in a storm that running before the wind the path of the advancing storm will be crossed, this is considered to be the dangerous semi-circle. This will always be the right-hand semicircle in the northern hemisphere, and the left-hand in the southern.

7. These forms are most frequent in the northern hemisphere from July to November, and in the southern hemisphere from December to May. In the Bay of Bengal and Arabian Sea the storm period is from April to December, the most dangerous storms

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occurring during the transition periods at the beginning and end of the monsoon.

8. The area over which revolving storms have been known to extend varies in diameter from 20 miles to some hundreds of miles, and their rate of movement in the West Indies averages about 300 miles a day; in the China Sea, Bay of Bengal, and Arabian Sea about 200 miles a day; and in the Indian Ocean from 0 to 200 miles a day, the more stationary storms occurring at the beginning and end of the hurricane season.

9. The indications of the approach of a revolving storm are (1) an unsteady barometer, or even a cessation in the diurnal range, which is constant in settled weather; (2) a heavy swell not caused by the wind then blowing; (3) an ugly, threatening appearance of the sky.

10. In order to judge what is the best way to act if there is reason to believe a storm is approaching, the seaman requires to know (*a*) in which direction the centre of the storm is situated, (*b*) in which semicircle the ship is situated.

11. As these points cannot be determined if a vessel is moving with any speed through the water, the first proceeding should be to "stop" or "heave to," and, as it is always best to assume, at first, that the vessel may be in the dangerous semicircle, she should be hove to on the starboard tack in the northern hemisphere, and on the port tack in the southern.

12. If an observer faces the wind the centre of the storm will be from 12 to 8 points on his right hand in the northern hemisphere, and on his left hand in the southern hemisphere; 12 points when the storm begins; about 10 points when the barometer has fallen three-tenths of an inch, and about 8 points when it has fallen six-tenths of an inch or upwards.

13. If the wind shifts to the right the vessel is in the right-hand semicircle, if to the left in the left-hand semicircle, and, if the wind is steady in direction, but increasing in force, she is in the direct path of the storm.

14. If the seaman has reason to think that his vessel is in the direct path of the storm he should run with the wind on the starboard quarter in the northern, and on the port quarter in the southern, hemisphere until the barometer has ceased falling. If she is in the right-hand semicircle in the northern hemisphere she should remain hove to on the starboard tack, but if in the southern hemisphere run with the wind on the port quarter: if she is in the left-hand semicircle in the northern hemisphere she should run with the wind on the starboard quarter, but if in the southern hemisphere remain hove to on the port tack.

15. Should a vessel not have sufficient room to run when in the least dangerous semicircle, she should heave to on the port tack in the northern, and on the starboard tack in the southern, hemisphere.

16. If in a harbour or at anchor the sea man should be just as careful in watching the shifting of the wind and ascertaining the direction of the centre, as by so doing he will be able to tell on which side of the path of the storm he is situated, and be able to act according to circumstances.

17. Should the centre of a storm pass over a vessel, the wind, after blowing furiously in one direction, ceases for a time, and then blows with equal fury from the opposite direction. This makes a confused pyramidal sea, which is especially dangerous.

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CHINA SEA PILOT

VOL. III.

CHAPTER I.

GENERAL INFORMATION: CHINA AND MANCHURIA, FORMOSA, AND KOREA — WINDS AND WEATHER — ICE — CURRENTS — TIDES — TIDAL STREAMS—SIGNALS—GENERAL SYSTEM OF BUOYAGE, ETC.—PILOTAGE—W/T STATIONS—COAL AND FUEL OIL—DOCKS AND REPAIRS—BRITISH CONSULAR OFFICERS — STANDARD TIME — NATIONAL REGULATIONS — QUARANTINE REGULATIONS — DERATISATION — CAUTIONS — GENERAL DIRECTIONS.

CHINA AND MANCHURIA.—China proper is divided into eighteen provinces. The provinces on the seaboard are Kwantung, which includes the island of Hainan, Fukien, Chekiang, Kiangsu, Shantung, and Hopei.

A portion of the seaboard of Manchuria, known as Kwantung province, which includes Ryojun kō and Dairen kō, was leased to Russia in 1908; this lease was transferred to Japan by the Treaty of Portsmouth in 1905, and, by virtue of a treaty concluded between China and Japan in 1915, this lease was extended until 1997.

History.—Traditional Chinese history is classified according to dynasties. Commencing with the Hsia dynasty (2205-1766 B.C.), the Chinese were settled in the upper valley of the Hwang ho or Yellow river, in occupation of the country now known as Kansu, Shensi, Shansi, and Honan.

During the Chow dynasty (1112-249 B.C.) China's three great philosophers lived, viz., Laotze (about 600 B.C.), Confucius (551-479), and Mencius (372-289).

The Tsin dynasty (249-206 B.C.), though of short duration, produced one Emperor of note, viz., Tsin Shih Huang-ti (221-210), whose name is famous for three exploits, viz., the consolidation of the Empire by sub-dividing it into 36 provinces, the building of the Great Wall of China, and the burning of China's classics.

The Han dynasty maintained its hold on the Empire in its two branches, Western and Eastern Han, from 206 B.C. to 221 A.D. During this dynasty the provinces now known as Fukien, Kwangtung, Yunnan, Szeckwan, and Liaotung (now part of Manchuria) were incorporated with the Empire, and the removal of the capital from Sianfu, in Shensi, to Lohyang, in Honan, took place in 25 A.D. Years of peace, during which the nation prospered, alternated with incursions by the Nomad Tartars. Numerous public works were undertaken, and the Classics were restored and engraved on stone.

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On the fall of the Han dynasty the Empire was divided into three kingdoms, but in 265 A.D. these were consolidated under the Tsin dynasty. At this period the incursions of the Tartar tribes from the north became more serious until, in 317 A.D., they established themselves permanently in North China and the capital was moved to Nanking and the dynasty, which lasted till 420 A.D., became known as the Tong Tsin dynasty.

For the next five centuries the history of the Empire is one of internal discord and rebellion, and with, for the most part, short-lived dynasties. One only, the Tang dynasty (618 to 907), lasted for any considerable period.

The Sung dynasty (960-1279) at first had its capital at Kaifeng in Honan, but early in its history the Tartars proved formidable neighbours. In 1125 A.D. the Kin Tartars founded a kingdom with its capital, later on at Peiping, and before these invaders the Chinese retired south of the Yangtze with Nanking as their capital. In 1270, the Mongols, who had overthrown the Kin Tartars, overran the Empire, and in 1280 the Mongol dynasty under Kublai Khan was established; during his reign Marco Polo, the Venetian traveller, was received at the Peking court.

In 1368 a successful revolution established once more a Chinese dynasty, the Ming (1368-1644), and the Mongols were driven from the country. Between 1618 and 1644 the Manchus made constant attacks on the Empire, and in the latter year entered Peking, now known as Peiping, and established the Manchu dynasty, of which the last Emperor abdicated in 1912 and a Republic was established.

The first attempt of the British to open a trade with China was in 1637; subsequently, the East India Company began to trade with the empire. Down to 1842 Canton was the only place at which Europeans generally were tacitly allowed to carry on trade with the empire; but in that year, after the war with the British, which concluded with the peace of Nanking, certain ports were opened to foreign trade. Since that date various treaties, further regulating the commercial relations between China and foreign countries, have been made with the British and other nations.

Physical features.—The whole of China is compact, forming a great continuous area. Only one large peninsula juts out from the general outline of the coast. The irregularities of the coast, except in the great estuaries of the Chu kiang or Canton river, Hangchow bay, and the Yangtze kiang, are comparatively small indentations. Southward of Hangchow bay the inlets and small coastal islands are innumerable, forming many good harbours for junks, if not for ships; while northward of Hangchow bay they are rare, except in the Shantung peninsula, and even there not many of them are convenient for shipping.

One of the most remarkable features of China is a great plain in the east, stretching southward from the mountains northward of Peiping to the lower valley of the Yangtze kiang, through about 8° of latitude, with a breadth of about 3° to 6° of longitude, and comprising also the peninsula between the Yantze estuary and Hangchow bay. The only interruption to it, which is partial, consists in the mountainous area which juts out in the peninsula of Shantung.

In all other parts of China mountains and other high lands prevail.

The north of China is characterised by the prevalence of a yellow earthy deposit of great fertility, named loess, which fills the valleys to a depth of thousands of feet and covers alike high and low grounds. It is apt to wear away in such a manner as to form terraced, vertical

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precipices, and being soft, is easily washed away from the banks of rivers, so that the rivers change their course frequently and their beds are encumbered by shoals. Partly from this circumstance, few of the rivers in the north are navigable.

The mountain range northward of Peiping extends eastward and approaches the shore of the Gulf of Liaotung in about lat. 40° N., and a range of mountains celebrated for their grandeur is situated near Chinchow fu. From Yingkow a magnificent plain stretches north-eastward to the River Amur; on the west this plain is bounded by the gradually rising mountains of Mongolia; the east part of the plain is skirted by usually low mountain ranges, which succeed each other eastward to the Sea of Japan.

All the chief rivers of China have a general course from west to east; these, with their tributaries and artificial canals, form the principal means of inland communication in China. Of the rivers, far the most important is the Yangtze kiang; only the estuary and its lowest tributary, the Whangpoo, are dealt with in this volume; above the entrance to the Whangpoo a detailed description is given in the Yangtze kiang pilot.

Treaty ports.—The principal treaty ports in China within the area described in this volume are: Swatow, Amoy, Foochow, Port of San-tu-ao, Wenchow, Ningpo, Hangchow, Shanghai, Tsing tao, Chefoo, Lungkow, Tientsin, Chingwangtao, Hulutao and Yingkow.

The open ports in the Japanese leased territory in Kwantung province are: Ryojun kō, Dairen, and Furanten kō; Ryojun kō is also a Naval port, and is open to merchant vessels during the daytime only.

Products and trade.—China is essentially an agricultural country. Wheat, barley, maize, and millet, and other cereals, with peas and beans, are chiefly cultivated in the north; rice, sugar and indigo in the south. Cotton is grown widely as far north as the southern part of Hopei, the chief area of production being the Yangtze valley. Tea is cultivated principally in the east and south. Silk culture is one of the most successful industries of China. Pigs are raised everywhere in China, and pig's bristles have become an important article of export.

Most of the provinces of China and Manchuria contain coal, and China may be regarded as one of the leading coal countries of the world. Gold, silver, copper and lead also occur.

In antimony China produces about 40 per cent. of the world's total production, of which the greatest quantity comes from the province of Hunan. Mining of wolfram is carried out at Swatow and the north-west part of Hopei; molybdenum has been found in the province of Fukien; and bismuth has also been worked.

The chief imports are cotton and woollen stuffs, cereals and flour, machinery and metal goods, kerosene; the exports are beans, bean-cake, bristles, cotton goods, eggs, tea, silk and silk manufactures, tobacco, animals and animal products, fish, etc.

Currency.—The currency of China is on a paper basis and consists of bank notes from one dollar upwards. The dollar is on a decimal basis, 100 cents being the legal tender; nickel coins of 20, 10, and 5 cents, and copper coins of 1½ cents were, in 1936, being issued by the Central bank of China. There are also other subsidiary coins of less than one dollar in circulation, but these are being gradually withdrawn following the minting of those mentioned above.

Weights and measures.—Owing to the various systems employed throughout the country there is liable to be some confusion in weights

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and measures. In 1934, however, the metric system was introduced and is adopted by the Chinese Maritime Customs; the comparative weights are briefly as follows:—

10 kung fen	=	1 decagramme	=	0·353 oz. avoirdupois.
10 kung chien	=	1 hectogramme	=	3·527 ,, ,,
10 kung liang	=	1 kilogramme	=	2·205 lbs. ,,
10 kung shih	=	1 ton.		

The measures of length are:—

1 kung li	=	1 millimetre	=	0·039 inches
10 kung li	=	1 centimetre	=	0·394 ,,
10 kung fen	=	1 decimetre	=	3·937 ,,
10 kung ts'un	=	1 metre	=	39·371 ,,
10 kung ch'ih	=	1 decametre	=	10·936 yards
10 kung chang	=	1 hectometre	=	about half a furlong
10 kung ying	=	1 kilometre	=	about 5 furlongs.

Communications.—*Railways.*—There are several Government trunk railways through the eastern part of China, but only a few of the principal ports on the east coast are connected to the railway system. One line runs from Canton in the south to Peiping in the north, via Hankow; Shanghai is connected to this line by a railway running south-westward through Hangchow and Nanchang, and is also connected to Peiping via Nanking, Tsinan, and Tientsin. Haichow is connected by rail with Sian fu, the capital of Shensi province, thus connecting with the lines between Hankow and Peiping, and between Nanking and Peiping; a branch line runs from Haichow to the new port of Lien yung kang. Tsing tao is connected by rail with Tsinan, and there is a branch line to Poshan.

From Tientsin a line runs north-eastward to connect with the South Manchurian railway to Moukden, from which lines run to Ryojun, Dairen, and Antung, the latter place connecting it with the Korean railway system (page 7). Moukden is also connected to the North Manchurian railway, and thence there is rail communication with Europe through Siberia.

Steam vessels.—There is regular steamer communication from the principal ports in China with the principal ports in other parts of the world, and coastal and river services are maintained.

Air routes.—In 1936 the following regular air services were in operation: Shanghai—Chengtu; Chungking—Chengtu; Shanghai—Canton, via Yung chia cheng, Foochow, Amoy, and Swatow; Shanghai—Peiping, via Nanking or Haichow, Tsing tao, and Tientsin.

In Manchuria there are regular air services between all the principal towns; these connect with the air route between Dairen and Tokio, and also with that between Moscow and Irkutsk.

Post and Telegraph.—There are post and telegraph offices at all the principal ports in the area covered by this volume, and they are connected to the general telephone system.

FORMOSA.—Formosa, named Taiwan by the Japanese, was ceded to Japan by China in 1895. Pescadores or Hōko rettō and a number of adjacent islands are included, administratively, with Formosa.

The Portuguese are believed to have visited Formosa earlier than 1550, but they do not appear to have made any permanent settlements there. The island was then inhabited by a collection of non-Mongolian tribes. The Dutch effected a settlement in the Pescadores in 1622, and removed to Formosa in 1624, but in 1662, Koslinga, the great opponent of the Manchu dynasty, captured Fort Zealandia, and drove

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the Dutch out of the island; several of his family reigned over Formosa until 1683, when the Manchus took possession of the island and made it a district of the province of Fukien, which it remained until ceded to Japan.

Formosa is administered by a Governor-General, and under him are the Bureaus of Home Affairs, Education, Finance, Industry, and Police. For the purpose of local government the island is divided into the five provinces Taihoku, Shinchiku, Taichū, Tainan, and Takao, each having a Prefect, and into the three departments Taitō, Karenkō, and Hōko, each of which is under an Administrator.

Physical features.—Formosa forms a link in the volcanic chain, which, commencing at New Guinea and running northward to the Kuril islands, constitutes the eastern escarpment of the former Malayo-Chinese continent; it is connected to the mainland of China by a submarine plateau, with general depths of less than 50 fathoms (91^{m}4), whilst the depths close up to the east coast of the island are considerable.

A chain of mountains runs through the centre of the island from north to south, dividing it into two watersheds north and south; the highest peak is Niitaka yama (Mount Morrison), 12,954 feet (3948^{m}4) high, situated nearly in the middle of the island. Eastward of this range the country is mountainous, and the cliffs on the east coast are the highest in the world, presenting in some places an almost sheer descent of about 6,000 feet (1828^{m}8). Westward of the central range are graduating hills, which eventually descend to broad plains running from north to south, intersected by rivers and streams, and finally terminating at the coast in sandbanks and mud spits; a most remarkable feature of this side of the island is the rapidity with which the land is extending seaward.

There are no important rivers. The largest is the Dakusui kei, which enters the sea in the middle of the western side of the island by several small branches. The Tōkō kei, the second largest river, flows in a southerly direction and enters the sea at Tōkō, on the south-west coast; although this river is broad, it is shallow and obstructed by sandbanks. The only lake, except for salt pans developed near the coast, is Jitsu getsu tan, with a circumference of about 9 miles, situated in the centre of the island at an elevation of about 2,400 feet (731^{m}5).

Earthquakes are of frequent occurrence, and it is considered ominous when a long period elapses without a shock being felt; as a rule not much damage is done. There is a record of a severe shock in 1872, which is said to have effected a considerable change in the coast; a severe shock also occured in 1862, and violent shocks in 1881, 1882 and 1892.

Population and industries.—In 1935 the total population of Formosa was 5,212,719, of which 270,457 were Japanese. The native inhabitants, which numbered 4,885,173 in 1935, are classified in two main races, the Han race and the aboriginal race; the former is again divided into those settlers from Fukien and those from Kwantung, and they form about 93 per cent. of the native population. The aboriginal race, the original and oldest inhabitants of the island, are again divided into semi-civilised and savages, both being of Malay descent; the savages are sub-divided into seven tribes, although they are broadly classified as northern or southern aborigines, the latter being more peaceful and submissive than the former.

Agriculture is the principal industry; the fishing industry is also very prosperous. Tea is the chief export.

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The island is, in general, fertile; rice, the principal agricultural product, sweet potatoes, and the sugar cane are cultivated almost everywhere. The principal fruits are bananas, longan, pears and oranges. The chief mineral products of Formosa are gold, silver, copper, coal, petroleum, sulphur, and phosphorous, which are mostly found in the north-eastern districts.

The forest area of Formosa is extensive and the camphor tree flourishes. There are several lumbering enterprises, principally for utilising the dense forests of coniferous trees that exist here and there.

Harbours.—The coastline of Formosa is very straight, and there are few harbours and bays. Kīrun kō, on the north coast, is the only harbour that can accommodate large vessels.

Kīrun, Ampin, Tansui, and Takao are open ports. Bako, in the Pescadores, is a Naval port.

Communications.—The Government railway runs from Kīrun to Takao, passing through Taihoku, Shinjiku, and Tainan; this is the trunk line of the insular railway system, and runs almost the entire length of the western side of the island. On the eastern side there is a railway from Kīrun to Su ō, passing through Dairi, Toi, Giran, and Rato; another line runs between Karen and Pinan.

There is a telegraph and telephone system in Formosa, and there is direct telegraphic communication with China and Japan.

Currency, weights and measures.—These are the same as in Japan, and are described under Korea, on page 7.

KOREA.—Korea, called Chōsen by the Japanese, lies between the parallels of 34° 18′ N. and 43° N., and the meridians of 124° 36′ E. and 130° 47′ E. Only the western coast, which is bounded northward by the Ōryoku kō, is described in this work.

The earliest records of Korea date from about 1122 B.C., when Kitz with some 5,000 Chinese colonists took Chinese arts and politics to that country. Almost the first knowledge of Korea obtained by Europe was furnished by Hendrik Hamel, a Dutch seaman belonging to the *Hillandra*, a vessel of the Dutch East India Company which was wrecked on Quelpart island in 1653, and the crew, being taken prisoners, were kept in captivity for several years.

In 1866 unsuccessful attempts were made by several European nations to conclude treaties with the country, and it was not until 1880 that the first one was made by Japan, this being followed by others concluded in 1882 by Great Britain and the United States, and shortly afterwards by France and Germany.

In August, 1910, Korea was annexed to Japan, and became a part of that empire, under the control of a Japanese Governor-General.

In 1932 the total population of Korea was 20,599,876, of which 523,452 were Japanese.

Physical features.—Northern Korea is mountainous and rich in timber, whilst southern Korea is fertile and well cultivated. The west coast is indented by many inlets, and is fringed by innumerable islands, islets and rocks. The principal rivers are the En ka, Daidō kō, and Ōryoku kō; it is unusual for a river in Korea to retain the same name throughout its course.

Products and trade.—All parts of Korea are suitable for agriculture, but the growth of crops is particularly satisfactory in the southern parts, where the climate is more genial. Rice is the most staple product, followed by barley, millet, soya beans, and wheat; cotton, tobacco, hemp, and ginseng are also grown. Fruit culture has of late produced very good results, and the area of plantation is gradually expanding.

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Cattle, of an excellent stock, are reared in the northern part of Korea, which is well suited for pasture. The fishing industry is considerable.

Korea is rich in minerals; gold, iron, coal and graphite are mined.

The principal exports are rice, soya beans, raw silk, fertilisers, timber, etc.; imports are flour, sugar, machinery, and manufactured goods.

Communications.—Korea is traversed from south to north by the Fusan-Keijo-Antung railway line, which connects at the latter place with the South Manchurian railway. There are several branches of this trunk line to ports on the west coast, such as Mokuho, Gunzan, Chemulpho, etc. The principal towns are connected to the general telegraph and telephone systems.

Open ports.—The open ports on the west coast of Korea are: Mokuho, Gunzan kō, Chemulpho, Chinnampho, Shin wiju, and Ryugan po.

Currency.—Weights and measures.—The currency of Korea, and the weights and measures, are those of Japan.

The unit of value is 0.75 gramme of pure gold=2s. 0½d., and is called the yen, which, however, is not coined.

Coinage consists of gold pieces of 5, 10, and 20 yen; silver of 10, 20 and 50 sen; nickel of 5 sen; and bronze of one sen. The sen is $\frac{1}{100}$ part of one yen.

Gold coins are not in general use, the ordinary medium of commerce being notes of the Bank of Japan, which are issued of the following denominations: 100 yen, 20 yen, 10 yen, 5 yen, one yen, and 50 sen.

The metric system of weights and measures was made obligatory by law in 1921, but has not yet been enforced. The following weights and measures are still in use:—

Sun		= 1·193 inches.
Shaku	=10 sun	= 0·994 feet.
Ken	=6 shaku	= 5·965 feet.
Cho (linear)	=60 ken	= 5·423 chains.
Ri (linear)	=36 cho	= 2·440 statute miles.
Tsubo		= 3·954 sq. yards.
Cho (square)		= 2·45 acres.
Ri (square)		= 5·955 sq. miles.
Sho (liquid)		= 1·588 quarts.
Sho (dry)		= 0·198 pecks.
To (liquid)	=10 sho	= 3·968 gallons.
To (dry)	=10 sho	= 1·985 pecks.
Koku (liquid)	=10 to	=39·68 gallons.
Koku (dry)	=10 to	= 4·96 bushels.
Koku (capacity of a vessel)		= $\frac{1}{10}$ ton.
Momme		= 2·116 drams (avoirdupois).
Kin	=160 momme	= 1·323 lbs. ,,
Kwan	=1000 momme	= 8·267 lbs. ,,

WINDS.—Pressure.—The distribution of pressure over the area is mainly the result of the anticyclone over central Asia in winter, and the low pressure area over South-east China together with the high pressure area over the Pacific near Japan in summer.

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In winter, the highest pressure along the coast is between Shanghai and the Hai ho; here, the average is about 1030 mb. in January. The pressure falls off to the north and south of this region to about 1020 mb. at Amoy, and 1028 mb. at Dairen; on the coast of Korea it is about 1026 mb. The pressure in Formosa is distinctly lower than that on the coast of China and Korea, averaging 1021 mb. in the north and west, and 1019 in the south and east.

In summer, there is very little variation in pressure over the coast: the July figures show about 1005 mb. throughout.

Pressure begins to rise in September due to the formation of the anticyclone, and there is a steady increase till November; from thence the barometer remains fairly uniform till the end of March. In March, the pressure again falls, and remains fairly steady during the summer months of June, July and August.

Diurnal variation decreases northward: In Formosa, as a whole, the variation is greater than 2 mb., being 3 mb. in December, and about 1½ mb. in July; but in the northern part of the island the variation is larger, the average being 2·5 mb., the winter and summer figures being 3·0 and 1·9 mb., respectively. On the south-eastern coast of China the winter and summer averages are 2·4 mb. and 1·2 mb. respectively. Further northward the variation in winter is considerably smaller: the variations on the southern Manchurian coast are 1·7 mb. in winter and 1·2 mb. in summer, whilst at Mokuho the variation is only about 1·3 mb. and is fairly even all the year round.

The accompanying diagram shows the equivalent of millibars in inches, and vice versa.

Winds.—The wind system over the area consists of the two monsoons: the winter monsoon blows from a northerly direction, and follows the establishment of the Siberian anticyclone; it is felt from October to February, and from March to May. This monsoon in the late autumn and winter often blows at gale force from the Gulf of Pohai to Hong Kong. The summer monsoon blows from a southerly direction, and is due to the high pressure area over the Pacific ocean and Japan; this monsoon is weak and irregular, particularly near the coast.

On the northern coast of Luzon the winter monsoon is experienced from about October to March; the winds are mainly from north to north-east, but occasionally winds are from north-westward, when they are stronger, and are often accompanied by cloudy weather and rain. In April, land and sea breezes are well marked, and from June to September southerly winds prevail. Squalls, accompanied by thunder and lightning, are frequent in summer.

From October to April, the winter monsoon holds in Formosa. In the north and west, winds are mainly north-north-easterly and north-easterly, and are often of gale force. In the south and east, winds are north-easterly, and are possibly a little more steady than those in the north; the average velocity here is 12 knots during November, but in the south velocity is not quite so high. In summer, from about June to August, a south to south-west monsoon wind is the most frequent in the north, but the wind direction is variable,

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and calm days are not uncommon; at Taihoku, easterly winds are experienced on one day in five on the average. In the south the wind directions vary greatly; at Koshun, from May to August easterly and west-north-westerly winds are the most frequent. The average wind strength in the south is high in winter: in November and December, the average is 20 knots at Koshun. On the eastern coast, the north-east monsoon often averages 40 knots for days on end in December.

Winds on the coast of China are those of the monsoon in the winter months. These conditions hold from September until March; but there is a slight variation along the coast in the most frequent direction. South-westward of Foochow winds are either from north-north-east or north-east, with occasional winds of gale force. On this part of the coast, the monsoon is often northward from 0200 to 1000, and eastward from 1000 to 0200. Further north, at Yung chia cheng north-westerly winds are most frequent; the winter monsoon is shorter in duration here, lasting only from October to February or March. Wind direction to the north of Yung chia cheng becomes more northerly, and at Ta chi shan (Gutzlaff island) the winter monsoon is north-north-westerly, and lasts over the entire life of the central Asian anticyclone. Further north, the monsoon again veers westward, and the prevalent direction at Shantung promontory is north-westerly; this direction is especially marked in December and January, though the monsoon extends from September to March. Gales are frequent. The summer monsoon in the southern part of China lasts from June to early September, and at Breaker point storms and gales are very rare in this part of the year; the prevalent wind direction is south-westerly. At Amoy, to the north, the most frequent direction is south-south-easterly; winds are uncertain however, and both gales and calm days are rather more frequent. Yung chia cheng (Wenchow) has a long season of southerly winds, lasting from March to the middle of September; it is not well marked, however, as the wind direction is variable, and calm days are very frequent throughout this period. Ta chi shan, although its season is shorter, has a much more defined monsoon season, lasting from May to July, and it generally extends to August; April often falls under this regime. Winds are from south or east, and are occasionally accompanied by gales. The direction of the monsoon veers further north, and at the Shantung promontory the monsoon direction is south-westerly from April to August. Calm days in this part are few.

The China coast westward of the Shantung promontory is under the influence of the winter monsoon from October to April; at Chefoo the most frequent wind direction is north-north-westerly. The monsoon is accompanied by many gales and storms, especially in December and January. Westward of the Gulf of Pohai, the winter monsoon season is shorter: November and February are the limits of the real monsoon. The prevalent direction is then from north-west to west-north-west and calm days are most uncommon; the average wind velocity exceeds 10 knots. September, October and March are transitional months between the winter and summer monsoons. The winds at Yingkow are northerly from September to February, but on the rest of the coast of Manchuria north-west is the prevalent wind direction from late September to March. On the western coast of Korea the prevalent direction in winter, between September and March, is north-north-west; calm days are few. The average wind force along this part of the coast varies from some 12 knots at Wei-haiwei, and is less along the southern and western coasts of the

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Gulf of Pohai, and at Chemulpho, in winter. In summer, winds are everywhere lighter (7 knots at Mokuho is the highest summer average), and more variable in direction. Near Weihaiwei the wind direction is uncertain throughout the summer, but southerly winds are more common than any others from about April to July (an average frequency of about 8 days a month of southerly winds in June); days of calm are frequent, and gales are very rare. At Taku the wind direction is again uncertain, but from March to August south-easterly winds are the most common. Yingkow, in the north, has a fairly well marked, though short, summer monsoon; the winds are between south and south-west for more than half the days from late April to mid July; from mid July to October winds from northward and southward are equally numerous, and are most frequent. Calm days are rare. On the southern coast of Manchuria most winds are from the south-westward from April to August, with, however, many calm days; in July in particular, south-easterly winds are common. On the western coast of Korea the general direction of the summer monsoon is south-west. In the north, the most common direction is west-south-west from May till July. In the south, the prevalent direction from May until August is from south to south-south-west; calm days are comparatively few.

Over the sea areas the monsoons are more precisely marked, and the force of the wind is decidedly greater. In the north-eastern part of the China sea, winds are north-easterly from September until May, except that in April easterly winds predominate in Luzon strait. June and July show the summer monsoon effect with south-westerly winds, but in the channel between Luzon and Formosa winds are very variable in direction. In Formosa strait, from October to April, winds from north-eastward prevail, occasionally backing to north. During these months, the average velocity exceeds 25 knots (except in April, when the winds are a little less certain), and maximum speeds of more than 60 knots have been recorded in these months. From June to August southerly winds prevail, though south-westerly winds are quite common. In the Tung hai or Eastern sea, winds are northerly in direction from September to April, north-east from September to November, and almost due north from January to March. The summer months show the effect of the monsoon, the wind direction in May being south-east, and from June to August south; in August easterly winds are frequent. In the Hwang hai or Yellow sea, the winter monsoon results in a fairly steady north-westerly direction from September to March. During December and January, the wind is almost invariably from this direction. The winds bring overcast weather, and frequently rain, whilst long-lasting gales from north-north-west are always likely. In the north-western area of the sea, the winds in winter are rather more northerly in direction. In summer, the general direction is south, being south-east near Tsing tao, and south-west near the Korean coast; these conditions prevail from April to July. Winds in August are uncertain in direction. Strong winds are rare in summer except when associated with typhoons, and squalls or thunderstorms, which occur occasionally during these months. The Gulf of Yalu is under the influence of the winter monsoon from September to March; in September the winds are mainly north or north-east; and from October to March the prevalent direction is north-west. These winds are cold and dry, and are frequently associated with gales, especially in late winter and early spring. From April to August, south-westerly winds prevail, but, particularly in August, wind direction is uncertain.

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In the Gulfs of Pohai and Liaotung winds are north or north-east from September to March, and south-west from April to July. Southerly winds of any strength can be expected to veer to north or north-west, and blow hard for many hours. The most common time for these changes is in autumn, and they can extend to the extreme northern part of the Yellow sea. Again, August is a transitional month, with many days of calm, and easterly winds in the south, and very variable winds in the north.

Gales.—The number of gales experienced annually varies greatly in different parts of Formosa: At Kīrun (Keelung) in the north-east there are well over 20 a year, of which more than 10 occur in the winter months. Gales are more common in the south, particularly near Koshun. Few gales occur during summer, except in association with typhoons. Gales in the Formosa strait are far more numerous; most of them being experienced in the early part of the winter monsoon period.

The south-eastern part of China suffers far less from gales than Formosa; at Amoy, which is however sheltered, the average figure is only 3 a year, and these occur in late winter. The number of gales experienced on the coast increases slightly northward, though Shanghai has an average of only 3 or 4 a year. Ta chi shan is situated about 70 miles eastward of Shanghai, and so experiences rather more gales; summer gales here are generally associated with typhoons or occasionally with extra-tropical depressions. In the vicinity of Shantung promontory there are many more gale days a year, nearly all occuring during the winter monsoon. In the gales of autumn and winter the wind usually commences from east-north-east, and backs through north to north-west, blowing with greatest violence from northward; a steady barometric fall is the only warning. Occasionally winds of gale force are associated with typhoons and depressions. Taku, on the western shore of the Gulf of Pohai, is more sheltered from gales, and has only about 10 a year, whilst on the northern shore of the Gulf 20 are experienced, mostly during the winter monsoon. Gales in the Gulf of Liaotung from the north-east or east in the autumn and winter are often short and sharp, and seldom last more than 10 hours. The western coast of Korea experiences about 10 days with gales a year, mainly in winter.

Gales at sea are more numerous than those on land. In Luzon strait there are from 15 to 20 a year, many of which are in September, October and November, during the early winter monsoon season. Few are experienced in spring. Gales are rather more frequent off the eastern coast of Formosa, and these are distributed in a similar way to those in Luzon strait. In the Tung hai or Eastern sea, gales are common; the number is smaller to the west near the land, and greater to the east. Winter is the most common time for these gales, particularly during January and February; spring is almost free from gales. In the eastern part of the Hwang hai or Yellow sea there are but few gales, and all of these occur in autumn and winter. In the sea southward of Korea there are rather more, the annual average being about 20; the worst month is February, with about 5 gales. In the Gulf of Yalu, and the Gulfs of Pohai and Liaotung, gales are not very frequent, more than half of these fall in December and January.

The number of gales at Chefoo and Tientsin are omitted from the tables in Appendix III. The proportion as a percentage of the gales received at each place during the month is:—

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Chefoo	12	10	11	9	9	4	3	3	7	8	12	12
Tientsin	8	11	18	18	11	9	3	1	—	1	12	8

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TYPHOONS.—General remarks.—The name "typhoon" is given to the fierce tropical cyclonic depressions experienced in the North Pacific ocean and the seas off the eastern side of Asia as far north as Japan. Winds in such a system blow round the central low, in accordance with Buys Ballot's Law, in an anti-clockwise direction. The centre, or the "eye of the storm," is a region of light winds, or even of calm. Winds immediately outside the centre are of hurricane force and the velocities reached have been so great that estimation has been difficult; velocities of over 100 knots have often occurred. The whole system has a motion of progression. It is often difficult to say whether the term "typhoon" should be applied to any particular disturbance, as the centre may not pass sufficiently close to an observer for him to experience winds of hurricane force. Frequently a disturbance, which starts as a depression, suddenly acquires typhoon force. For these reasons, all cyclonic disturbances in the tropics are classified as typhoons, with the qualification in doubtful cases of "intensity unknown." Probably 50% of such disturbances develop into typhoons; some authorities, however, consider 25% to be much nearer the mark.

The zone of origin is eastward of the Philippine islands; there is an annual movement of the mean latitude. The mean latitude of the zone of origin for the different months is:—

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
8°00′	7°00′	6°30′	8°50′	13°20′	14°55′	15°00′	16°05′	14°40′	11°30′	10°10′	8°30

There is also a longitudinal swing, the mean longitude of the zone of origin varying from about 160° E. in January to 140° E. in June. The season when typhoons are experienced in the area considered in this volume is from about May to October, so that the average zone of origin for this time is about 15° N. and 130° E.

Frequency and Period.—The number of typhoons experienced in all parts is about 23 a year; this number is subject to considerable variation, and typhoons recorded in individual years range from 11 to 38. The average number experienced in the area covered by this volume is from 10 to 15 annually. With 12 as the average, the monthly distribution is approximately:

	May	June	July	Aug.	Sept.	Oct.
No. of typhoons a year..	·7	·8	3·0	2·9	2·3	1·0

Typhoons are much less frequent in the north, and generally are of less intensity, though occasional typhoons of great violence have been experienced in Korea.

In March and April, there is the possibility of a typhoon in the Balintang channel. In May, Formosa and the Balintang channel are liable to typhoons.

In June, Shanghai and the latitudes southward of that place, as well as the south-western part of Korea, are in the danger zone. There are two main tracks: across the northern part of Luzon travelling north-westward, and crossing the coast southward of Amoy; the second track is that of typhoons which recurve in the Balintang channel.

July is the most dangerous month, and the whole area is then liable to be visited. In the early part of the month there is a well defined track of typhoons which travel north-westward, passing across Formosa. During the rest of the month there is no specially marked track; the south-eastern coast of China experiences on the average about one typhoon a year. Balintang channel is a real danger area, whilst Korea is only visited in occasional years.

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During August typhoons may occur over the whole area, except that the area lying north-westward of a line joining Shantung promontory and Chemulpho is free towards the end of the month. Again there is an average of about a typhoon a year in this month on the south-eastern coast of China; a typhoon in the Balintang channel is experienced in most years.

In the beginning of September, the danger area is the vicinity of Shanghai and southward of that place, together with the south-western part of Korea; but by the end of the month only Formosa and the area southward of Foochow are liable to typhoons. At this time of the year typhoons average about one every other year in Formosa, the south-eastern coast of China, and the Balintang channel. Typhoons occasionally visit Korea during this month.

Later than September, the only danger area lies southward of Amoy. In November, typhoons even in the Balintang channel are very rare.

Tracks.—The usual track of a typhoon is west-north-westward after birth, and a continuation in this direction until it "recurves," after which it proceeds in a north-easterly direction. Recurving usually takes place at about latitude 25° N. There is, however, a movement northwards of the mean zone of recurving from January to July, and a return southward again from August. The velocity of progression before recurving is about 11½ knots between the latitudes of 25° and 35° N.; about 70 per cent. of the typhoons have a velocity within 2 knots of this figure. There is usually a marked decrease in speed before the recurving takes place, but after the storm has started to move north-eastward the velocity is higher than before, and 20 knots is the average; the speed of advance is much more variable at this stage than before recurving, and velocities of from 25 to 30 knots are not uncommon. The maximum speeds recorded have been 24 knots (before recurving) and 52 knots in Japanese waters (after recurving).

It should be realised that the above rules about recurving of typhoons are not universally true; thus a storm can recurve with no loss in speed, and conversely a storm can slow down appreciably and not recurve. Very curious tracks are occasionally described. Some typhoons have described a complete circle, thus visiting the same place twice; whilst others have been known to recurve south-westward. A typhoon can remain stationary for a considerable time.

The following rules have been formulated with reference to the movement of typhoons:—

1. Typhoons tend to move parallel to the isobars which lie outside the storm itself.

2. Typhoons will avoid a stationary anticyclone by passing round it one way or the other.

3. If an anticyclone advances towards a typhoon, the latter will generally either turn away from the advancing high pressure area, or will cease to move.

4. Typhoons tend to follow in the wake of a retreating anticyclone, and under these circumstances they may move across the isobars.

The above four rules hold for about 75 per cent. of recorded cases, but have failed in varying degree in about 25 per cent. A typhoon is more likely to avoid an anticyclone which is increasing in intensity than one which is decreasing, and it may even elect to move towards the latter.

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It is sometimes stated that tropical cyclones move so as to keep an area of high pressure on their right. This is often not the case; but, nevertheless, this rule generally holds in the case of oceanic permanent highs.

Warnings.—*Swell.*—In the open sea, provided there is no intervening land between the ship and the typhoon centre, the swell probably gives the first indication. The swell radiates straight outwards from the centre, and may extend to more than 1,000 miles. It is in any case nearly always felt at 400 miles from the centre. At distances greater than 200 miles, this is the most reliable indication of the bearing of the centre. Any change in the direction of swell is a useful guide to the track of the typhoon.

Barometer.—This cannot be relied upon to give adequate warning, but its readings are of value when considered with other precursory signs. Between the latitudes of 25 and 35° N. disturbances due to such sources as depressions over the Yangtze valley affect pressure readings over considerable areas; the barometer warning is, therefore, often too late to be of much service. Unsteadiness is generally believed to be an indication of the approach of a typhoon; but similarly unsteadiness is often associated with tropical thunderstorms and summer squalls. In any case, typhoons do not always create barometric unsteadiness.

Under ideal conditions, with the centre passing near to the observer, there are three phases of the change in pressure (true more for the southern part of the area):—

1. A slow fall in which the diurnal variation is still apparent, usually at from 500 to 120 miles from the centre.

2. A distinct fall in which the diurnal variation is marked, usually from 120 to 150 miles from the centre. Throughout this stage the barometer is very unsteady.

3. A rapid fall, usually from 60 to 10 miles from the centre. It is not uncommon for the barometer at the centre to stand 60-70 mb. lower than in the region just outside the storm field.

A very low pressure in the central area is frequently associated with a fierce typhoon; but this is by no means always the case. In fact the typhoon of August 1st 1931, one of the worst ever experienced at Hong Kong, had a minimum recorded pressure of 993 mb.; this was probably not, however, the pressure at the centre.

In the rear of a typhoon the pressure rises as quickly as it had fallen in front of the centre.

Wind.—Generally speaking, cyclonic winds are not felt beyond 400 miles from the centre of a typhoon in tropical latitudes, and beyond 700 miles in higher latitudes; such winds are first noticed at distances of less than 100 miles from the centre. The isobars of a typhoon are more or less circular, and the wind approaches the centre, converging at an angle of 30°; the centre thus lies at approximately 120° at the right hand of an observer facing the wind. The angle of convergence differs slightly in the four quadrants, being greatest on the right front, and left rear quadrants. It is often best with a typhoon in the offing to heave to and watch events; by remaining stationary it is much easier to ascertain the quadrant in which the vessel is situated, and the speed at which the typhoon is approaching.

The wind direction should be carefully watched, as a permanent change in the direction will indicate a change in the position of the typhoon centre relative to the observer. If the wind remains steady in direction, whilst increasing greatly in force, the centre will pass

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close to the observer. On the average the following forces are experienced in different parts of the typhoon: force 12 at 35 miles from the centre, force 11 at 50 miles, and force 6 at from 150 to 200 miles. Deceitful lulls sometimes occur that can possibly be mistaken for the central calm. The maximum wind force is experienced just before the central calm, and comes as a terrific squall.

The average diameter of the centre of a typhoon increases with increasing latitude; it is approximately 30 miles at about 30° N., and it takes from one to 2 hours to pass over a stationary observer. But individual storms can differ widely from these averages. Mountainous cross seas run in the centre, which are a greater danger to shipping than the squalls in the body of the storm.

After the centre has passed, there is a terrific squall from the direction opposite to that of the last violent gust before the centre; the wind velocity decreases as the storm recedes until finally normal conditions return. If the centre does not pass over the observer, no calm period will of course be experienced; neither will any sudden violent change in wind direction be observed.

From 100 to 150 miles from the centre, heavy rain sets in, which soon becomes torrential. Heavy rainfall is associated with all typhoons, and visibility is in consequence greatly affected; at sea visibility is frequently less than a cable due to the rainfall. When the eye of the storm arrives, the rain generally ceases completely, and the sky becomes brighter, and a thin broken layer of alto-stratus (through which the sun or moon is visible) replaces the dark pall. The temperature often rises. As the centre passes, the sky again becomes overcast, and rain sets in; this is just as heavy, but not so long lived as that which preceded the centre. The greatest rainfall ever recorded during the passing of a typhoon was 46 inches at Baguio (which is half as great again as the annual average rainfall at Portsmouth); falls are not quite so heavy in latitudes northward of 25° N., but 20 inches is often experienced. Only very rarely is thunder and lightning experienced during the passing of a typhoon.

Cloud.—Cirroform clouds generally precede a typhoon; it does not necessarily signify that a typhoon is approaching if cirrus clouds are seen, but conditions should be carefully watched. This warning is not so valuable in the Hwang hai or Yellow sea area as in the tropics, as cirroform clouds are also associated with depressions. The cirrus clouds travel in the direction of the progression of the centre, and not radially outwards, as has been suggested; unfortunately, the sky is generally too overcast for this to be of much service.

Such clouds often give rise to beautiful and lurid sunrises and sunsets: a fiery, copper-coloured sky is not uncommon, but any or all the colours of the rainbow can be visible. Such displays are not always associated with a typhoon.

Peculiar fracto-cumulus clouds or "scud" often appear before a typhoon. These look like rags of black cloth drifting just above the horizon, and may be present in an otherwise cloudless sky. As the typhoon approaches, the ragged clouds become more numerous, and banks of clouds appear above the scud, which, as time passes, coalesce into a single sheet of nimbo-stratus with fracto-nimbus below. The low cloud area extends from 200 to 250 miles from the centre of the typhoon, but individual storms differ a good deal in this respect.

The effect of a tropical revolving storm on the set of the current.—In the vicinity of a tropical revolving storm the set of the current may be markedly different from that to be expected normally.

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The tropical storm produces a set radiating outwards from the centre of the storm, which is probably due to a combination of the following:

(*a*) A swell radiating from the centre.

(*b*) The piling up of water in the centre, producing a more or less radial flow.

(*c*) The effects of the earth's rotation upon the currents generated by the winds associated with the storm.

The set of the currents actually experienced at a place in the vicinity of a tropical storm will, therefore, be a combination of the set of the current to be expected normally at that place and this additional set radiating from the centre of the tropical storm. When the first of these is relatively weak the radial set will be predominant, and in particular situations may produce a resultant set completely different from the normal. Unless, therefore, due allowance is made for this radial set, very serious errors in reckoning may arise. It is reported that, in one case, a vessel experienced a south-easterly set of more than 50 miles, under conditions when the set to be expected normally was south-westerly; in another case an unexpected south-south-westerly set of 60 miles was experienced in 18 hours.

Recorded accounts of typhoons.—The following descriptions are of four typhoons recorded during this century.

The "de Witte" occurred from the 1st to the 16th of August, 1901. It was one of the most violent typhoons ever experienced on the Chinese coast; it approached China travelling west-north-west, and struck the coast between Foochow and Yung chia cheng on the night of August 1st-2nd. It travelled in a great curve through Fukien, and across the province of Chekiang, and continued north-north-westward across Asia, a very abnormal path. On the coast, a minimum pressure of 915 mbs. was registered. The storm was so called, of course, due to the destruction by it of the 2,000-ton Russian steamer *de Witte* which, although almost new, and thoroughly seaworthy, was knocked to pieces.

An aberrant typhoon was observed in the Pacific lasting from Auguat 10th to the 16th, 1924. This was first observed in the western Pacific, near the Marianas islands, on August 5th, and was remarkable for the track which it followed. The majority of the disturbances travel north-west or even west until they strike the mainland of Asia, when they fill up, or recurve to a northerly or north-easterly direction. This typhoon, fully developed and violent, followed a looped track south-westward of Japan, travelling south-west on August 10th, south and south-east on August 11th, and moved very slowly eastward from August 12th to the 16th. Finally on August 17th it resumed its normal track, and continued across the Sea of Japan. So unusual was the track that a steamer was wrecked because its captain, thinking a typhoon could not possibly advance south-westward, neglected to take precautions.

The Swatow typhoon, between August 2nd-3rd, 1922, was one of the worst in the history of the China seas. It was first observed as a disturbance near the Caroline islands on July 27th, moving west-north-west and increasing in intensity. On July 31st, the typhoon passed over Luzon, when it turned northwards, and passed directly over Swatow on the night of August 2nd-3rd. A barometric reading of 938 mb. was registered, the wind was violent and the rain torrential. Shipping suffered greatly, several steamers being washed ashore, and 75% of the fishing fleet was wrecked beyond hope, but the greatest damage was due to an enormous wave which swept away all remaining

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houses. 50,000 out of a population of 65,000 were estimated to have lost their lives. The height of the water after the typhoon was at one time 12 feet (3m7) above the normal high water level, and it was several days before the excess drained away.

A violent typhoon passed over Hong Kong on August 18th, 1923; the centre itself was but 14 miles from the town. The diameter of the centre was about 7 miles, outside which winds had velocities greater than 90 knots; one gust was recorded of 110 knots. This was the highest velocity then recorded.

Typhoon harbours.—The following anchorages, within the area described in this volume, are available in a typhoon:—Swatow; Clipper road; Namoa island; Tongsang harbour; Amoy harbour; Port Kimoi; Tansui kō and Kīrun kō, in Formosa; Singhwa wan; Haitan strait, southern entrance; Loyüan bay; Port of San-tu-ao; Angle island, Little pass (for a single vessel); Namkwan harbour; Pikwan harbour; Hei niu wan; Lo ching wan; Tai chow lieh tao; Nimrod sound.

In the Chusan archipelago: Tinghai outer and inner harbour; Chang tao harbour; Sinkeamun harbour (for small vessels); Taochu harbour (for small vessels). In the southern approach to the Yangtze kiang: the northern side of Ta chu san.

Extra-tropical cyclones.—Extra-tropical cyclones (Continental depressions) are experienced in winter and early spring in latitudes northward of 25° N. When a depression is imminent, the surface wind veers from south-east to south-west in the warm sector (south-east and south-west of the centre). This causes westerly winds, often followed by north-westerly gales. In the cold front, thunder rains and lightning can be expected during the summer; in winter however such displays are rare. This type of storm has been found to follow a depression across the continent, even in January. There is little information as to whether such storms continue across sea areas. The arrival of the squall line is followed by a violent cold air onrush, with showers, and in winter in North China and the Shantung promontory, with snowstorms and blizzards. In the Yangtze valley, these storms are infrequent, and never occur in the first half of winter; snow is sometimes experienced in November, however. In spring and early summer, extra-tropical depressions are more foggy and thunderous than in winter, but the winds are not so violent. The rain accompanying these storms is more continuous in advance of a depression in summer.

WEATHER.—Temperature.—The average annual temperature varies from about 80° in the south of Formosa to 50° in the northern part of the Gulf of Yalu.

In winter, the average temperature in Formosa varies from about 60° in the north to 68° in the south of the island. The temperature on the east coast is higher than that on the west coast, which does not exceed an average of 62° for the most part. China and Korea as a whole experience a cold dry winter, under the influence of the monsoon. Breaker point in the extreme south has the highest average temperature, on the mainland, with 59°. At Amoy it is 57°, but northward of this place the average temperature falls rapidly; the January average at Yung chia cheng is 46°, whilst at Shanghai it is only 38°. On the land near Shantung promontory it is below freezing point, and at Weihaiwei the average in January is 28°. The land near the Gulf of Pohai is decidedly lower in temperature, as is to be expected; at Taku the average is only 20°. The coldest part of the region is

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Antung, on the south-east coast of Manchuria, with an average of 14°. The temperature in Korea is considerably less extreme, Chemulpho having the average of about 23°, whilst at Mokuho the average is about frezing point. Ice is formed on the rivers northward and westward of the Gulf of Pohai, and the northern shore of the Gulf of Yalu; the season when the rivers are ice bound is from December to early March.

The variation of temperature along the coast line is very much less in summer; indeed, the average does not vary by more than 5° from 80° over the whole area. The climate is everywhere warm and damp during this season, and the nights are close. Again, Formosa is the warmest part of the area; it has an average temperature of about 83° over its entire coast line. From Hong Kong to Yung chia cheng the average temperature is about 82°, and at Ta chi shan and Shanghai the average only falls to 80°. The temperature on the coast northward of Shanghai to Shantung promontory is about 79°, and from Weihaiwei to the southern shore of the Gulf of Pohai the average is between 77° and 78°. The district southward of Manchuria has the least summer average of 75°. Temperature increases southward of the Korean coast, the average for Mokuho being just under 80°; the climate is less relaxing and unhealthy here than on the China coast.

The average winter daily minimum temperature shows great variation over the region. Formosa is the least extreme, having an average minimum of more than 50° in all parts, and about 60° in the south-west. On the mainland, Breaker point with an average minimum of 54° is the least cold. The fall in the average is not great on the northern part of this coast, but near Yung chia cheng, the average minimum begins to fall rapidly; at this point 40° is the average, and at Shanghai 33°. At Weihaiwei, westward of Shantung promontory, 25° is the winter average minimum. The western shore of the Gulf of Pohai averages 18°, and the northern shore 3°, whilst Antung in the north-east has the mean of 7°. The southern part of Korea is far less extreme, and has the mean of 27° at Mokuho. Shanghai is the furthest south where days below freezing point are experienced in normal years. Spring and autumn at Shanghai are subject to quick and great variations in temperature, and the temperature will sometimes fall 30° in a few hours; this is true to a greater or lesser degree for the whole of the China coast. Weihaiwei has an average number of 50 days annually below freezing point; these occur from November to March, January being the coldest month with over 20 days below 32°. Taku, on the western shore of the Gulf of Pohai, has some 60 days below freezing point, whilst Yingkow, on the northern shore, has over 100 days; these all fall between October and May, and December and January are almost continuously below 32°. Antung experiences the same conditions as Yingkow. The coast of Korea is much warmer, particularly in the southern part, where there are only about 30 days a year below freezing point. These are in the period from December to March, and about half are experienced in January.

The average summer maximum does not vary greatly along the coast. The south-eastern coast of China and the coast of Formosa have an average of about 90°; the northern part of Formosa has a mean of from 2° to 3° higher than the southern part. The average varies slightly locally along the coast of the mainland; Taku has the average of 86°. Dairen, situated on a peninsula, has the lowest average of about 82°. The western coast of Korea has everywhere

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a mean summer maximum of 84°. Only on occasional days northward of Weihaiwei is there an average greater than 90° for the day; even as far south as Shanghai there are only 2 or 3 days a year with an average above this figure. Days with a maximum temperature greater than 90° vary from about 30 at Mokuho (half in August) and Yingkow to nearly 80 at Taihoku (mainly in July and August).

Extreme temperatures in January differ greatly along the coast. Over Formosa itself the variation is great: in the southern part, 50° is the lowest temperature recorded, whilst in the northern part, Taihoku has had a temperature below freezing point; there are, in fact, occasional frosts. On the mainland, southward of Foochow, temperatures of lower than 32° are rare. Minimum temperatures are much lower further northward: Ta chi shan, although an island, has recorded 15°, and from Shanghai to the Shantung promontory temperatures of about 10° have been recorded. The shores of the Gulf of Pohai have had very much lower temperatures than this; at Yingkow on the northern shore a minumim of −24° has been experienced; temperatures even nearly approaching this figure are very rare, however. Conditions are less extreme southward of the Korean coast, but Mokuho has experienced 6°. Absolute summer maximum temperatures show little variation along the coast. The lowest maxima are 95° at Koshun and 92° at Weihaiwei, and the highest 104° at Yung chia cheng. The whole of the mainland has experienced temperatures in the neighbourhood of 100°.

Diurnal variation is greater in the north than the south on the mainland. Formosa has variations of 16° in summer and 11° in winter in the north; and about 12° all the year round in the south. The south-eastern coast of China has a variation of less than 10° throughout the year, but Foochow and Yung chia cheng to the north have averages of 12°. At Shanghai the variation has increased to about 14°; but at Ta chi shan the variation is 9°. Variation remains much the same up the coast, with a slightly greater figure in winter. Thus Weihaiwei has 13° and 11° for the January and August averages. Yingkow in the north has high variations: 18° in January, and 14° in August; these are typical of the southern coast of Manchuria. Mokuho in south Korea has smaller variations: 13° in spring, and about 10° for the summer and winter months.

Temperature over the sea areas in winter varies some 60° over the region. In the southern part of Luzon strait average temperature is 73°, but in the northern part it is 68°. The average temperature of the shores of Formosa strait is 61°, with the eastern shore a few degrees warmer than the corresponding western shore. Temperature decreases steadily northward, and the 32° isotherm lies between Haichow and Mokuho. Northward of the Gulf of Pohai, the average temperature is about 21°; north-eastward temperature is as low as 14°. The temperature of air over the sea is almost uniform over the region in summer. The average temperature exceeds 80° for the whole area southward of Yung chia cheng; nowhere does the mean exceed 83°. The 80° isotherm joins Shanghai to Mokuho and Chemulpho. The temperature over the Hwang hai or Yellow sea is for the most part nearly 80° and in the north-western part of the Gulf of Pohai the average temperature does not fall below 75°.

Humidity.—The average annual relative humidity varies between 60 per cent. at Tsingtao and 85 per cent. at Kirun.

In winter, the south-eastern part of Formosa has an average of 75 per cent. and the north-western part about 84 per cent. The coast

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of China as far northward as Haichow has an average of from 75 to 80 per cent, being slightly higher in the south. There is a decrease in humidity between here and Tsing tao, and between Tsing tao and Taku the relative humidity falls from 70 per cent. to 55 per cent. Humidity is a little higher on the southern coast of Manchuria, varying between 60 per cent. at Yingkow to 70 per cent. at Antung; Mokuho, in the southern part of Korea, has an average humidity of 70 per cent. Diurnal variation is about 25 per cent. in the extreme north, and between 15-20 per cent. for the rest of the region.

In summer, humidities generally are greater throughout the region. The northern coast of Formosa is an exception, however, its average being under 80 per cent. in July and August; the average on the southern coast is 85 per cent. The entire south-eastern and eastern coasts of China have a humidity greater than 80 per cent., and at places, namely, Ta chi shan and Ying chia cheng, 90 per cent. is sometimes exceeded for the month of August. On the southern shore of the Gulf of Pohai, and the land eastward, the average is from 75 to 80 per cent. the north is now slightly lower in relative humidity, averaging 75 per cent. in August. Mokuho has an average of 85 per cent. Diurnal variation is much greater in summer than winter, as is to be expected. The northern and southern parts of Formosa have variations of 25 per cent. and 20 per cent., respectively. For the coast of the mainland as a whole, from 25 to 30 per cent. is the average variation; Chemulpho with 43 per cent. shows the greatest variation.

Rainfall.—Formosa has a very heavy annual rainfall; this island generally has the average of about 80 inches. The central part of the eastern coast averages rather less than this amount, and the northern and southern extremities considerably more. Kīrun in the northern part, which is exceptionally wet, averages about 120 inches a year. Except in the northern part, the rainfall is seasonal in character. In winter, rainfall is not heavy, and at Koshun the December average is only one inch, whilst further north generally, the rainfall rarely exceeds 3 or 4 inches during any winter month. Kīrun, being exposed to the monsoon, which blows direct from the ocean, has a fall of 12 inches during each month from October to January. In summer, the whole area is under the influence of the southerly monsoon, and receives heavy rain. In the southern part rain is liable to occur in very heavy showers, which also occur during typhoon disturbances; 20 inches is the average for August. Very heavy falls in 24 hours have been experienced in the more southern parts, the heaviest yet recorded being 16 inches at Taito; such heavy falls often give rise to serious flooding.

The south-eastern coast of China averages about 50-60 inches, but further northward the amount of rainfall diminishes; Shanghai has the yearly average of 40 inches, whilst rainfall in no part of the land near the Gulf of Pohai exceeds 30 inches. Yingkow averages 25 inches; Mokuho, being further south, has the higher average of 40. It must be emphasised that rainfall can deviate widely from the average from year to year. Such a case is at Peiping, which in one year received six inches, and two years later 43 inches; on the coast rainfall variation is not quite so pronounced as this, but it can vary between very wide limits.

The south-eastern coast of China is fairly dry throughout the winter months, December being the driest month with a rainfall of between 0.5 and one inch. Shanghai marks the southern boundary of the dry season proper, and has a rainfall of one inch in December,

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but further north winter rains are much lighter; Tsing tao and Weihaiwei both have only about 0.5 inch of rain in February, and land bordering the Gulf of Pohai receives at most 0.2 inch as an average in February. The southern part of Korea is naturally more rainy, and receives a minimum monthly fall of over one inch.

Summer is the wet season over the whole area, though the average amount of rain deposited differs considerably in different parts. Rainfall on the south-eastern coast of China is much less than in Formosa; 12 inches in June is the maximum near Breaker point, but the rainfall falls off a little to the north. Yung chia cheng, however, shows a higher figure than the coast immediately southward, namely, 10 inches in June. Shanghai experiences rather less rain, and August is the wettest month with 6 inches. Tsing tao is a little more exposed, and receives 7 inches in August. The maximum amount of rain recorded in 24 hours is less to the north; Amoy has recorded 9 inches during one day in April, whilst the Shanghai maximum is about 6 inches; Shantung has received a fall of about 8 inches. Weihaiwei has an average fall of 6 inches during August, and along the shores of the Gulf of Pohai the monthly average does not exceed this figure. Chemulpho receives very heavy rains in July and August: the average is some 12 inches in one month or the other, and 20 inches for these combined. Mokuho in the south does not receive nearly such heavy rains, 8 inches in August being its maximum. The maximum fall in 24 hours varies from about 6 inches to the south and west of the Gulf of Pohai to about 8 inches at Yingkow and on the coast of Korea. Although some of the falls mentioned above are considerable, they scarcely compare with some falls which have been received at some stations in Japan.

Rainy days are more frequent in the south than in the north. Formosa, particularly in its northern part, has a great many days of rain; Taihoku has nearly 200, evenly distributed during the year, and Kirun well over 200, with about 23 rainy days in the winter and 10 in summer months. Koshun, in the southern part, has 150 rainy days with a summer figure of 20 monthly. On the mainland rainy days are far less frequent, about 75 being annual mean at Breaker point, with a June maximum. Yung chia cheng has nearly 150 rainy days, with a maximum in late spring, and Shanghai has 130, fairly evenly distributed through the year; there are, however, slightly more rainy days in spring than at any other time. Further north, rainy days are considerably fewer. Tsing tao has an average of about 90; these are chiefly during the summer months. The shores of the Gulf of Pohai have considerably fewer rainy days, whilst the island of Howki, with but 35, has the smallest average number of rainy days; here, only an occasional rainy day is experienced in winter. The western coast of Korea has about 100 rainy days in the northern and central parts, falling principally in summer; Mokuho, in the southern part, has some 130 rainy days, spread fairly evenly over the year.

Snow is experienced in latitudes north of about 28° N. At Shanghai itself, a fall of snow on 6 days a year is the average; the normal limit of these snows is between January and March. Tsingtao averages about 15 snow days, between December and March. Weihaiwei suffers from occasional snow storms (*e.g.*, during extra-tropical depressions), and there is an average of about 30 days with snow. Snow can be expected from November to March at Yingkow, the longest normal period in the area, but snow only falls on about 20

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days. The range of possible snowfall decreases only slightly on the shores of the Gulf of Yalu, so that Mokuho, in the extreme south-west of Korea, has 30 snow days a year, which occur between the middle of November and the middle of March.

Thunderstorms.—These are experienced to the extent of between 10 and 20 throughout the coasts of China and Korea; they are slightly more common in the south, and in all cases, occur almost entirely during the summer months. There are more thunderstorms in Formosa than on the mainland, the north-western coast being particularly affected. At Taihoku, in fact, as many as 40 a year are experienced; these are most frequent during August, when about 15 have been recorded. Storms on the mainland vary from about 15 at Shanghai and 20 at Tsing tao and the Shantung promontory to 10 in the southern part of Manchuria and on the coast of Korea. Near Yung chia cheng thunderstorms are frequent during the summer months, specially between 0600 and 2000. Except near the Shantung promontory, where the storm season lasts from May to August, the bulk of the thunderstorms occur in July and August in all parts.

Visibility and Fog.—For the most part, fog is most common in spring and early summer. Formosa is almost free, 7 being the average number of days with fog at Kīrun (mainly in spring); at Koshun fogs are very rare. On the south-eastern coast of China, fog days average about 20. At Amoy, these occur mainly in the spring, and at Foochow, in the winter; at both places, summer is almost free from fog. Further north, fogs are less frequent on the mainland; but at Ta chi shan 50 is the mean number of fogs, May and June being the foggiest periods. Fogs are common at the mouth of the Whangpoo from November to June; these often clear away by about midday. At Tsing tao fog is frequent in July, and at the Shantung promontory about 25 days with fog a month are experienced. Weihaiwei has some 20 a year, mainly in July, and they are very uncertain in character; a fog will lift and disperse, then settle down again with practically no warning. The coast westward of Weihaiwei is comparatively free; Taku and Yingkow both experience only 4 fogs a year, and these occur principally in winter. The south-eastern coast of Manchuria is decidedly more foggy, some 20 being the annual mean; at Dairen there is a maximum in July of about 6 or 7, but at Antung fogs can be expected at any time of the year. Fogs are slightly more common on the western coast of Korea—there is an average of about 40 a year at Chemulpho; these fall in early summer, July averaging 10. Mokuho, in the southern part, has about the same annual figure, namely, 30, and there is a maximum in July of about 6 fogs.

Visibility in the south is often affected by dust hazes in winter. Fine loose sand storms are a cause of impaired visibility on the central part of the coast of China. These storms are brought by the winds due to the advance of the Mongolian anticyclone in November, December and January; the sand is probably raised from the Ordos desert. After the strong winds at the formation of the continental anticyclone, the monsoon then calms down, and from the upper atmosphere a thick and very persistent layer of fine loose sand falls to the ground. At sea, and southward of the Shantung promontory, this very thick layer is usually produced after the passage of a gale front.

Cloudiness.—Cloud amount decreases northward: Taihoku, with 7·1 tenths, has the greatest cloud amount in the Formosa area;

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the southern parts of Formosa have the mean annual amount of 6·0. Taihoku has the greatest average amount in winter, whilst Koshun experiences its greatest cloud amount in early summer, with winter as the clearest period. On the south-eastern coast of China generally the cloud amount is rather less than over Formosa, and there is, as at Koshun, a summer maximum of cloud amount, and a late autumn minimum. In the north, cloud amount differs more strongly in different seasons. At Yingkow, for instance, the yearly mean cloud amount is 4·0; in summer, the cloud amount is 5·7, whilst cloud amount frequently averages about 2·4 for December. Cloud amount is rather greater on the coast of Korea, and the average at Mokuho is 6·4, being 7·6 in July and 5·0 in October.

Overcast days are much more common in the south than in the north, Formosa as a whole has about 100 such days a year, there being more during summer than any other part of the year; Taihoku is particularly cloudy, and, due mainly to overcast skies in winter, has the annual average of nearly 200 days. The mainland experiences well over 100 days of cloud in the south-east. Shanghai is one of the cloudiest places on this coast; here there is an average of about 170 a year, with the slight spring maximum of 17 days a month. The Shantung promontory is freer from cloudy days, 100 being the annual mean, whilst the southern coast of Manchuria has only some 60 overcast days a year; July with 9 days is the cloudiest month. Korea has as many cloudy days as the more southern parts of China; as many as 20 days of cloud are experienced at Mokuho during a typical July.

The number of clear or bright days increase northward along the coast, as is to be expected; 30 is the average annual figure at Taihoku and 150 at Taku; at the latter place there are 15 clear days during each winter month, but few during the summer. Korea is less bright than southern Manchuria; 50 is the annual number of clear days at Mokuho.

Cloud amount over land and sea areas shows an appreciable difference throughout the year. During the winter monsoon season, though skies above sea areas are cloudy, those over most land areas are relatively free. During the summer monsoon season, cloud amount is high on the land areas, but relatively low over the sea, except in June.

ICE.—Ice may be experienced in the Gulfs of Pohai and Liaotung from the middle of November to the end of March. The most severe cold may be expected in January and February.

In October the temperature of the sea falls 20°, and sharp frosts frequently occur at night; at the end of October snow falls in the northern part of the Gulf of Liaotung, and at the end of November, at the entrance to the Hai ho, severe frosts and snow accompany northerly and easterly gales. Thin ice then forms rapidly at low water on the extensive mud flats, and is carried by the flood tide into the rivers, which are frozen up about the middle of December; the ice becomes compact, and fills the head of the Gulf of Pohai within a line drawn south-south-westward from Sha lui tien banks.

In January, field ice 23 miles in extent, and 6 inches thick, has been passed through south-eastward of Taku. Early in February floating ice has been encountered about 75 miles south-eastward of Taku, whilst 32 miles farther in the ice was packed and from 20 to

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30 inches thick; detached masses of ice were carried along the coast of Tsao-fei-tien island by the current, and inside the island the ice appeared to be permanent.

The Liao ho, which flows out in the north-eastern corner of the Gulf of Liaotung, is frozen over from December to March, the ice being from 9 to 24 inches thick. The ice season at Dairen kō, in the Kwantung peninsula, lasts from the early part of January to the early part of March, and in very cold weather ice floes may consolidate into one sheet of ice over the whole of the outer harbour.

CURRENTS.—As knowledge of oceanic circulation increases it becomes more and more apparent that currents are very variable both in rate and direction, and that even the most marked and permanent of them run in streaks which frequently alter their direction, producing great variations within a few miles or at short intervals of time. The broad drift currents, formed by the influence of the winds, naturally vary even more.

The principal currents of the seas in the area described in this volume are the north-east and south-west monsoon drift currents and the Kuro shio. The drift currents are very variable, their direction and rate depending much on local circumstances, but that during the north-east monsoon is the stronger and more constant. The rate may be considerably increased by a typhoon or gale.

During the period of the north-east monsoon, from October to April, the general set of the current is south-westward, commencing at Korea strait and setting towards the mouth of the Yantze kiang; thence it flows down the coast of China, and through the western side of Formosa strait. The rate of this current off the coast of China is from 10 to 50 miles per day, according to the strength of the monsoon, increasing to from 60 to 65 miles per day in the southern end of Formosa strait; in the open water of the Tung hai its rate is reduced to a maximum of 45 miles per day. Between the southern extremity of Formosa and the northern extremity of Luzon the general direction of the currents through Bashi and Balintang channels is westerly during the north-east monsoon. Part of the North Equatorial current passes through these channels and joins the monsoon current of the China sea, setting south-westward at a rate of from 10 to 50 miles per day.

During the south-west monsoon the current may be expected to flow in a north-easterly direction, but it is not constant, and, should the wind be light or moderate, it is liable to set in various directions; in the southern part of the Tung hai it may be strengthened by the Kuro shio.

During the strength of the south-west monsoon the current sets north-eastward on the coast of China between Hong Kong and Foochow and through Formosa strait, at a rate of up to 30 miles per day; on the north-western coast of Formosa this may be increased to as much as 50 miles per day by the western branch of the Kuro shio, and an eddy is formed in the area between Kīrun kō and the mouth of the Min kiang, which may cause a westerly set of from 5 to 30 miles per day.

The Kuro shio or Japan stream may be said to begin near the northern part of the Philippine islands, where the North Equatorial current, in its westerly course, strikes these coasts and is deviated northward and southward. The northern branch is named the Kuro shio.

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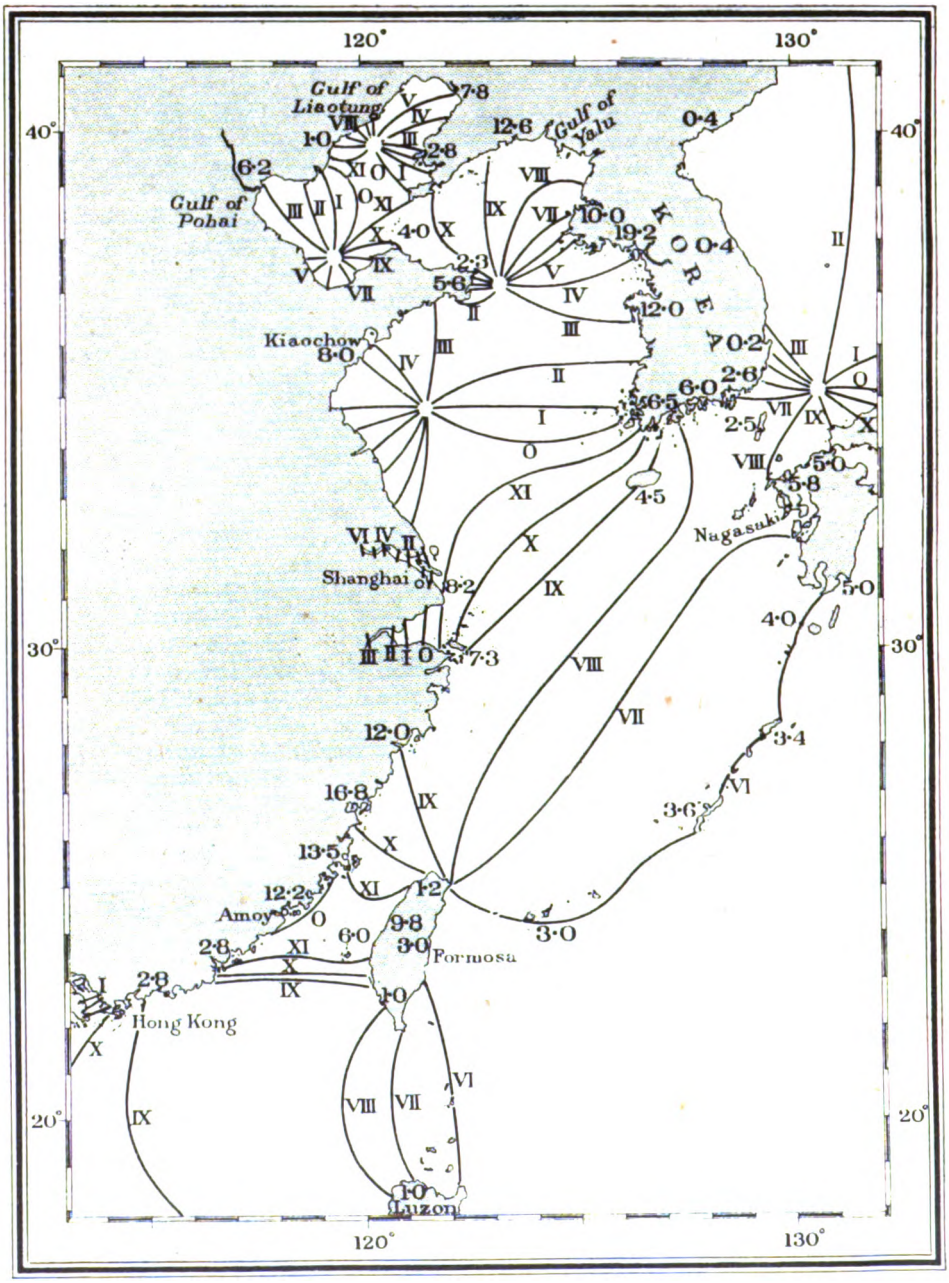
To face page 27.



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The main body of the Kuro shio passes along the eastern side of Formosa, through the islands between Formosa and Japan, and along the south-eastern side of Japan; in its course branches of this current pass up the western coast of Formosa and into Hwang hai and Korea strait.

Off the eastern coast of Formosa the Kuro shio sets northward almost parallel with the coast. Off the southern extremity of Formosa this current has a width of about 25 miles, with its centre about midway between Garan bi and Kōtō shō; the maximum rate here is about 3 knots, but this is considerably reduced at its outer sides. Thence the current sets in a north-north-easterly direction, its rate diminishing as it proceeds northward; on the parallel of 23° N. the width of the current is about 25 miles, with the centre about 20 miles offshore, and the rate is less than 2 knots. Close to the eastern coast of Formosa a counter current is often perceptible. The rate of the Kuro shio in winter does not appear to be diminished by the north-east monsoon.

Another branch of the Kuro shio passes up the western side of Formosa, through Pescadores channel, and unites again with the main branch off the northern extremity of Formosa. This branch has not the same steady flow as that along the eastern side of Formosa, and is considerably affected by the monsoons.

It is highly probable that the Kuro shio is of some considerable depth, and that it follows an un-deviating track which is not always consistent with recorded observations, the surface water to a depth of several feet being sometimes found to flow in a contrary direction. The mean temperature of this current is about 80°, being warmer by from 5° to 15° than the waters which bound it on either side.

The currents are indicated graphically on charts 2939-2950, 2957-2960.

For the effect of a tropical revolving storm on the set of the current, *see* page 15.

TIDES.—The diagram facing this page shows the general progress of the tide wave from the Pacific ocean to the coasts of China and Korea, and the Gulfs of Pohai and Liaotung.

The Roman figures indicate the high water luni-tidal intervals in hours, and the lines are co-tidal lines. High-water occurs at approximately the same time at any position on a line. The Arabic figures show the spring rise.

Tidal information for the southern shore of the Gulf of Pohai and for the coast of China from the Yangtze to about lat. 35° N. is incomplete and the co-tidal lines and spring rise cannot be shown.

As will be seen from the diagram, the tidal wave advances with some approach to regularity, and more rapidly in deep than in shallow water; the height of the wave, however, as shown by the spring rise, may differ greatly at different parts of the same line; for instance, on the X hour line at the entrance to the Hwang hai, the spring rise is 9 feet (2^m7) at Quelpart island, from 13 to 20 feet (4^m0 to 6^m1) on the coast of China, and only 3 feet (0^m9) at the northern end of Formosa. The rate of advance of the wave depends, in fact, principally on the depth and shape of the whole sea under consideration, but its height at any place depends on local conditions at that place.

The diagram refers to the semi-diurnal tide wave ouly, that is to say to the lunar wave which causes two high waters and two low waters in

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each lunar day, and to the solar wave which causes two high waters and two low waters in each solar day; these waves combine and spring tides occur at, or shortly after, new and full moon, when the high water of both occur at the same time; neap tides occur at, or shortly after, quadrature, when low water of the solar wave occurs at the same time as high water of the lunar wave.

The tides are, however, also affected by diurnal waves, which cause diurnal inequality in both the times and heights of high and low water; this, which is principally an effect of the moon's declination, reaches its maximum when, or shortly after, the moon is in greatest declination and vanishes when, or shortly after, the moon crosses the equator; its effects are reversed on the moon crossing the equator. In the neighbourhood of Hong Kong the diurnal inequality is very pronounced and single day tides occur when the moon is in high declination near neaps, or when the semi-diurnal tide is small and the diurnal tide great; over the remainder of the area considered, though diurnal inequality is always noticeable and important when the moon is in high declination, it is not sufficient to cause single day tides.

The diurnal wave advances with the same regularity, and is changed in range in the same manner, as the semi-diurnal wave shown on the diagram, but, as its period is twice that of the semi-diurnal wave, the rate of its advance is differently affected by the depth of water and the shape of the sea, and its range is differently affected by local conditions. As both the times and heights of high and low water are affected, as the effects vary at different places and at different times at the same place, and as the effects are reversed on change of declination from north to south, it is not possible to give definite rules regarding the diurnal inequality; the times and heights of high and low water found from the tidal constants given on the charts are, therefore, subject to considerable errors and must be used with caution; times and heights of high and low water at Standard and Secondary ports may be correctly obtained from the tidal predictions and differences in the Admiralty Tide Tables.

Though definite rules for ascertaining the diurnal inequality cannot be given, some information as to the tidal conditions to be expected may be obtained from the following:—

The highest and lowest spring high water occur when the moon is in high declination at new or full moon, or near the solstices; the moon will then be near the equator at neap tides, when diurnal inequality will be small. The highest and lowest neap high waters occur when the moon is in high declination at quadrature, or near the equinoxes; the moon will then be near the equator at springs, when diurnal inequality will be small. In summer and winter, therefore, the higher high water at spring tides will be considerably above the level of mean high water spring tides, the lower high water at spring tides will be considerably below the level of mean high water spring tides, but both high waters at neap tides will be at about the level of mean high water neap tides; under these circumstances the lower high water at spring tides may be below the level of mean high water neap tides. In spring and autumn both high waters at spring tides will be at about the level of mean high water spring tides, but the higher high water at neap tides will rise considerably above the level of mean high water neap tides, and the lower high water at neap tides will be considerably below the level of mean high water neap tides; under these circumstances the higher high water at neap tides may rise above the level of mean high water spring tides. The highest and lowest spring tides thus occur

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in summer and winter, the highest and lowest neap tides in spring and autumn, but at all seasons of the year the higher high water at neap tides may rise higher than the lower high water at spring tides.

TIDAL STREAMS.—Between Hong Kong and Breaker point the tidal streams set eastward and westward. Between Breaker point and the Chusan archipelago they set northward and southward, the north-going stream causing a strong inset towards the coast. Throughout the Chusan archipelago, in the approach to, and in the estuaries northward of it, the tidal streams increase greatly in rate, and attain an exceptional and extreme rate in Hangchow bay; northward of the Chusan archipelago, and off the mouth of the Yangtze kiang, the tidal streams are strong and rotatory, About 150 miles northward of the mouth of the Yangtze kiang the tidal streams are weak and rotatory; around Shantung promontory they are complex.

Off the western coast of Formosa, and in Pescadores channel, the tidal streams set northward and southward (*see* page 162), the rate of the north-going stream being increased by the Kuro shio, and that of the south-going stream being reduced, or entirely nullified, by this current. On the eastern coast of Formosa the tidal streams are only noticeable close inshore, within the inner limit of the Kuro shio.

On the western coast of Korea the tidal streams generally set northward and southward, but their directions are considerably deflected by the numerous islands off this coast.

SIGNALS.—China Seas Storm Signal Code.—This code, adopted from 1st March, 1931, is in use at the following places within the area described in this volume: Amoy, Ma wei anchorage, Ta chi shan, Woosung, Weihaiwei, Chefoo, Taku, and Yingkow. The code is divided into two parts, typhoon warnings and gale warnings.

The purport of a signal, either for a typhoon or a gale, is indicated in the following manner:—There are ten symbols, given below, which in various combinations indicate latitude and longitude, and also form the following tables:—Table No. 1, Direction signals; Table No. 2, Condition signals; Table No. 3, Radius and intensity signals; Table No. 4, Time signals; Table No. 5, Gale signals.

The following are the symbols in use:—

indicating the figures

1 2 3 4 5 6 7 8 9 0

The signals are displayed from the yardarms and the mast head of a Storm signal mast and have the following significance:—

Typhoon and depression signals:—

(*a*) Four symbols at one yardarm, showing the position of the centre; the two upper symbols indicate by their corresponding numbers the degrees of latitude, and the two lower symbols indicate the last two figures of the degrees of longitude, so that the cypher 1 must be prefixed to obtain the longitude when it exceeds 100°, thus: 32° indicates longitude 132°, etc.

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(*b*) Three symbols at the other yardarm: of these the upper two indicate the direction the typhoon, etc., is travelling (*see* Table No. 1), or, alternatively, certain conditions of the typhoon as indicated in Table No. 2. The lowest and single symbol indicates the radius of the circle whose centre is shown by the latitude and longitude (*a*), together with the degree of intensity, or to indicate a Continental depression, etc. (*see* Table No. 3).

(*c*) One symbol at the masthead indicates the time at which the typhoon was in the position indicated by (*a*); *see* Table No. 4.

The only velocity signals given are "stationary or very slow," which is an alternative to the direction of motion, and "exceptionally high rate of travel" which may be given in addition to the direction of motion, in the manner shown at (*b*). In this connection the following table will be useful:—

Latitude (North).	Rate of travel of typhoons in knots.							
	Before recurving.				After recurving.			
	Ordinary limits.	Mean.	Exceptional Velocity as signalled.	Maximum Recorded.	Ordinary limits.	Mean.	Exceptional Velocity as signalled.	Maximum Recorded.
° °								
5 to 15	5 to 12	9	11 or above	22	—	—	—	—
15 „ 20	5 „ 14	10	12½ „	24	5 to 17	10	13 or above	22
20 „ 25	7 „ 16	11	13 „	19	14 „ 23	17	21 „	30
25 „ 30	7 „ 13	11	13 „	15	11 „ 23	18	23 „	47
30 „ 35	—	—	—	10	11 „ 36	20	25 „	42
35 „ 40	—	—	—	16	12 „ 36	21	26 „	50
40 „ 45	—	—	—	—	17 „ 36	21	26 „	48
45 „ 50	—	—	—	—	12 „ 36	21	26 „	52
50 „ 55	—	—	—	—	12 „ 37	21	26 „	49

The position indicated by the latitude and longitude signals does not purport to be the precise position of the centre of the typhoon, but merely the centre of a circle of specified radius within which the centre of the typhoon is believed to lie. In the case of two centres, the position given refers to the one more advanced on the track.

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TABLE I:—DIRECTION SIGNALS.

Two upper symbols of hoist.

Direction of motion. (1)	Code Figures. Typhoon. (2)	(a) Typhoon or Depression. (3)	Depression. (4)	Anticyclone. (5)
NNE	0 2	6 2	0 0	3 3
NE	0 4	6 4	0 1	3 4
ENE	0 6	6 6	0 3	3 5
E	0 8	6 8	0 5	3 6
ESE	1 0	7 0	0 7	3 7
SE	1 2	7 2	0 9	3 8
SSE	1 4	7 4	1 1	3 9
S	1 6	7 6	1 3	4 0
SSW	1 8	7 8	1 5	4 1
SW	2 0	8 0	1 7	4 2
WSW	2 2	8 2	1 9	4 3
W	2 4	8 4	2 1	4 4
WNW	2 6	8 6	2 3	4 5
NW	2 8	8 8	2 5	4 6
NNW	3 0	9 0	2 7	4 7
N	3 2	9 2	2 9	4 8
Unknown	5 3	9 3	3 1	4 9

(a) The word "typhoon" has been retained as it is in general use throughout the Far East. The word "cyclone" is in this case preferable.

The figures in columns 4 and 5 will not be displayed on the storm signal masts; they are for the "general inference" following a synoptic message. The display of the figures in column 3 is optional. 5

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TABLE 2:—CONDITION SIGNALS.

(Alternative to Table 1).

Two upper symbols of hoist.

Typhoon.		Depression.		Anticyclone.	
Code figures. (1)	Condition. (2)	Code figures. (3)	Condition. (4)	Code figures. (5)	Condition. (6)
5 1	Forming.	7 3	Forming.	8 7	Forming.
5 2	Two centres.	7 5	Filling up.	8 9	Dissipating.
5 3	Direction unknown.				
5 4	Stationary or very slow.	7 7	Filled up.	9 1	Dissipated.
5 5	Curving N.	7 9	Stationary or very slow.	9 4	Spreading N.
5 6	„ NE.	8 1	—	9 5	„ E.
5 7	„ E.	8 3	V-shaped depression.	9 6	„ S.
5 9	„ SE.	8 5	No remarks.	9 7	Northern portion has moved eastward leaving a separate anticyclone over China.
6 1	„ S.				
6 3	„ SW.			9 8	Stationary or very slow.
6 5	„ W.			9 9	No remarks.
6 7	„ NW.				
6 9	Filling up or Curving N.				
7 1	„ NE.				
5 8	Filling up.				
6 0	Filled up.				

The figures in columns 3 and 5 will not be displayed on the storm signal masts. They are for the "general inference" following a synoptic message.

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TABLE 3: RADIUS AND INTENSITY SIGNALS.

The lowest of three symbols.

(*b*) Code figures.	(*a*) A typhoon or a depression.		Anticyclone.	
	Radius of position circle.	Intensity, etc.	Radius of position circle.	Condition.
1	120′	Unknown.	150′	Feeble.
2	120′	Severe.	150′	Moderate.
3	60′	Unknown.	150′	Strong.
4	60′	Severe.	120′	Feeble.
5	—	Deepened.	120′	Moderate.
6	30′	Unknown.	120′	Strong.
7	30′	Severe.	—	Strengthening.
8	—	Exceptionally high rate of travel.	—	A vague area of high pressure.
9	—	Continental depression (*c*).	—	—
0	—	Position of centre uncertain.	—	Position of centre uncertain.

(*a*) The word "typhoon" has been retained as it is in general use throughout the Far East. Used in conjunction with the "intensity" signal the word "cyclone" would be preferable.

(*b*) The figures in Table 1 will indicate whether the figures in this column refer to a typhoon, a depression, an anticyclone or the doubtful case of "typhoon or depression."

(*c*) As there is no column for "continental depression" in Table 1, when this signal is sent the direction of motion will be given by means of the figures in column 2 of Table 1.

TABLE 4:—TIME SIGNALS.

Single symbol at masthead.

Day.	To-day.				Yesterday.				
Code figures.	1	2	3	4	5	6	7	8	9
Time meridian 120° E.	0600	1100	1400	1700	0600	1100	1400	1700	Position deduced from supplementary information received since last warning.

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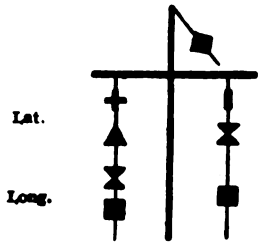
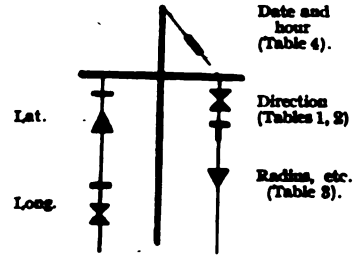
Examples.

DEPRESSION SIGNAL.



At 1700 yesterday a continental depression in Lat. 56° N., Long. 100° E. was travelling E.S.E.

TYPHOON SIGNAL.



At 0600 today a severe typhoon within 30 miles of Lat. 26° N., Long. 120° E. is travelling N.E.

Gale warning signals.—

(*a*) One symbol at one yardarm indicates the region threatened by the gale; *see* Table No. 5.

(*b*) Two symbols at the other yardarm indicate the direction from which by the gale is blowing; *see* Table No. 1.

(*c*) One symbol at the masthead indicates the hour at which the gale was as stated in (a) and (b); *see* Table No. IV

5

Table 5:—Gale Signals.

One symbol at yardarm showing the locality of the gale.

Code figures.	District.
1	Annam coast.
2	Gulf of Tongking.
3	Formosa channel.
4	Formosa to Yangtze.
5	Yangtze to Shangtung promontory.
6	Gulf of Pohai and Gulf of Yalu.
7	Sea of Japan.
8	North of Hokkaidō.
9	Eastern coast of Japan.
0	Southward of Kyūshū.

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TABLE No. 6:—TYPHOON NIGHT SIGNALS.

Annam and China sea. Lat. 8° to 17°; Long. 106° to 120°.

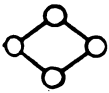
Tongking to Swatow. Lat. 17° to 24°; Long. 106° to 117°.

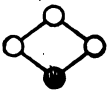
Formosa and approaches Lat. 17° to 27°; Long. 117° to 126°.

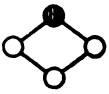
Tung hai and Hwang hai. Lat. 27° to 35°; Long. 120° to 128°.

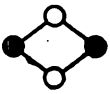
Hopei to Korea. Lat. 35° to 42°; Long. 117° to 128°.

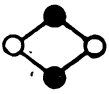
Southern Japan. Lat. 27° to 36°; Long. 128° to 140°.


Sea of Japan. Lat. 36° to 44°; Long. 128° to 140°.

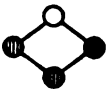

Hokkaidō and Sakhalin. Lat. 44° and northward; Long. 136° & eastward.

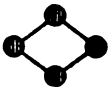

East of Japan. Lat. 28° to 44°; Long. 140° and eastward.


Pacific ocean, S.E. of Liu Kiu islands. Lat. 17° to 27°; Long. 126° to 140°.


Pacific ocean, S.E. of Bonin. Lat. 17° to 28°; Long. 140° & eastward.

Philippines and Pacific ocean. Lat, 6° to 17°; Long. 120° to 138°.


Pacific ocean, Yap, Guam. Lat. 6° to 17°; Long. 138° and eastward.


Threatening danger here and in the neighbourhood.

Gale on the coast S. of Lat. 30°.

Gale on the coast N. of Lat. 30°.

These night signals are, at present, only shown from the time ball tower at Shanghai.

Supplementary storm signals.—The following signals are displayed from the Custom house flagstaffs at the Port of San-tu-ao, Ningpo, Chinhai, and Shanghai:—

By day:

(*a*) Probable bad weather: one black ball.

(*b*) Probable typhoon or strong gale: two black balls disposed vertically.

At night:

(*a*) Probable bad weather: one *red* light at the masthead.

(*b*) Probable typhoon or strong gale: two *red* lights disposed horizontally.

The night signals are not shown at the Port of San-tu-ao.

At Shanghai, simultaneously with the exhibition of the day or night signals indicating a probable typhoon or strong gale, a gun will be fired from the Pootung point signal station and from the Lay road signal station. In addition to the Custom house flag staff,

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the day and night signals are shown also at the Custom house on the western side of the entrance to the Yangtzepoo, and from the mast on the water-tower at Ping an dock.

These supplementary storm signals are to be considered as additional to the China Seas Storm Signal code, at the ports where such signals are exhibited, and are primarily intended as a warning for small craft in the harbour.

Japanese storm signals.—There are two systems of storm signals used in Japanese ports, namely, general and local signals. The general signals indicate the position of a cyclonic centre and its motion, &c., while local storm signals indicate that gales or storms of dangerous intensity may be expected at the locality where they are displayed, and in some places the general and local signals are displayed side by side. The only ports in this volume at which the general signals are displayed are Kīrunkō, Karenkō, Ryojun kō, Dairen, and Chemulpho.

General storm signals.—(*a*) By day the signals are made from a mast with a yard by means of certain symbols; these symbols and their equivalent numbers are as follows:—

1 2 3 4 5 6

The symbols are usually red, but in some places, to suit local conditions, they are white.

(*b*) At night the signals are made by means of *red*, *white*, and *green* lights.

1. Day signals.

(*a*) Three symbols, disposed vertically, at one yardarm of the storm-signal mast, indicate the number of the district in which the centre of a typhoon or cyclone is situated, thus:—

Indicates district 314. *See* chart I.

(*b*) Two symbols at the other yardarm indicate the direction of the progressive motion. *See* Table I.

(*c*) The rate of progression is shown by changing the relative positions of the direction symbols to the yardarm. *See* Table II.

(*d*) One symbol at the masthead indicates the time at which the centre was located, and the intensity of the rotatory storm. *See* Table III.

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To face page 34.

DAY SIGNALS for General Storm Signals. JAPAN and KOR

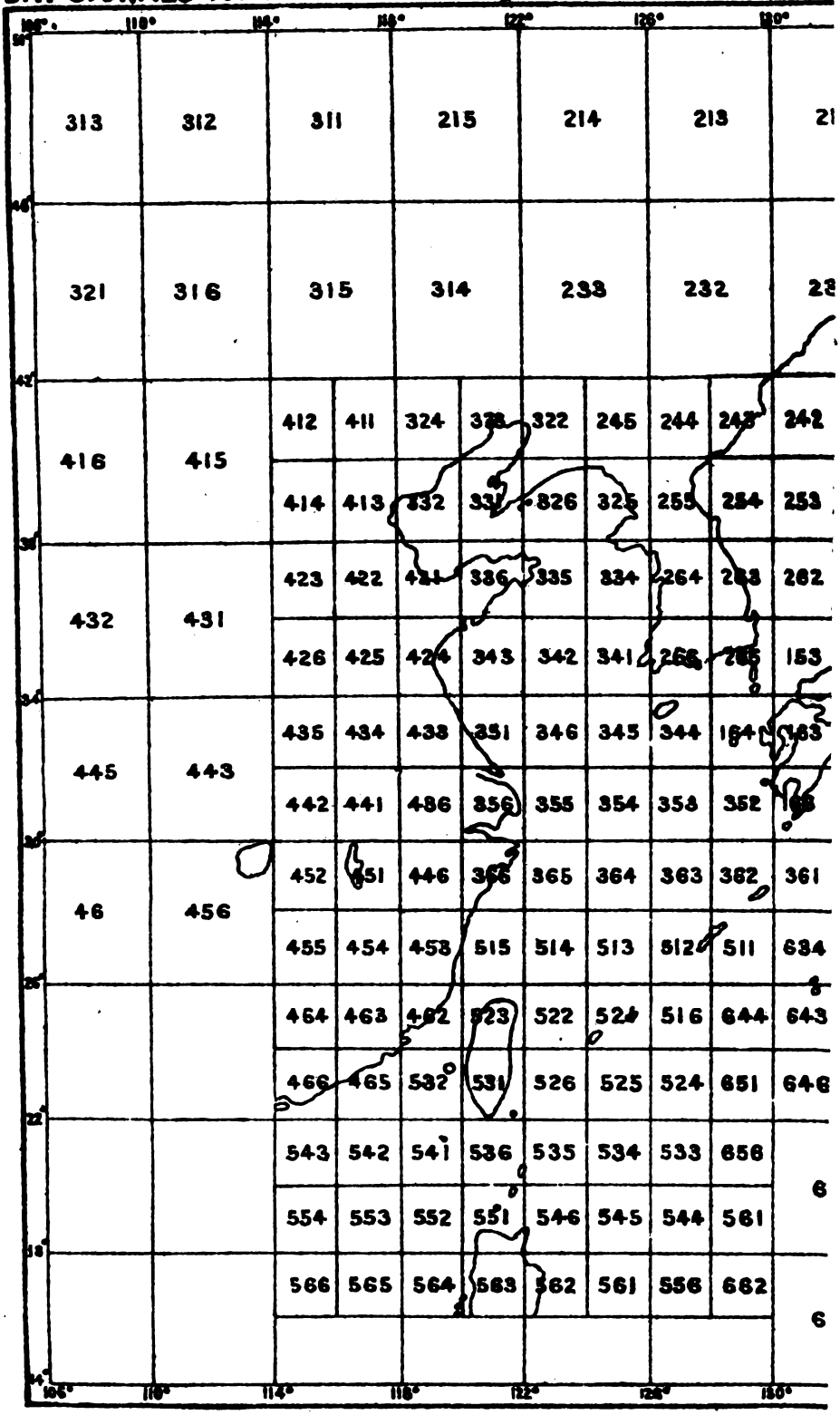

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TABLE I.—Direction of motion.

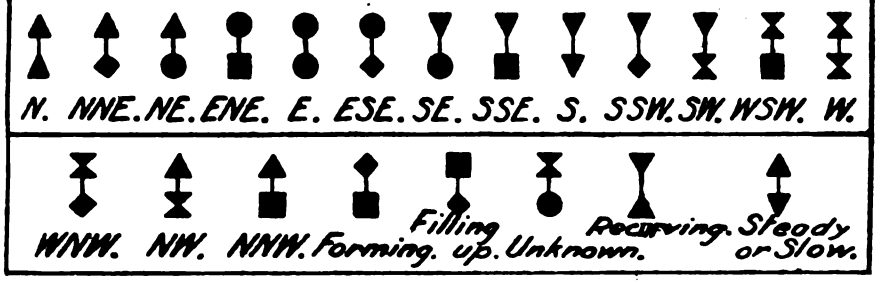

TABLE II.—Rate of progression.

Direction symbols separated by the normal distance.	Velocity not known.
Direction symbols separated by twice normal distance.	From 10 to 20 miles per hour.
Twice normal distance between yardarm and upper symbol.	From 20 to 30 miles per hour.
Twice normal distance between yardarm and upper symbol. Also twice normal distance between the two symbols.	Over 30 miles per hour.

Table III. Time and Intensity

Time / Intensity	This Morning 0600	Noon to-day 1200	Last Night 1800
Not indicated	●	⧗	◆
Violent	▼	▲	■

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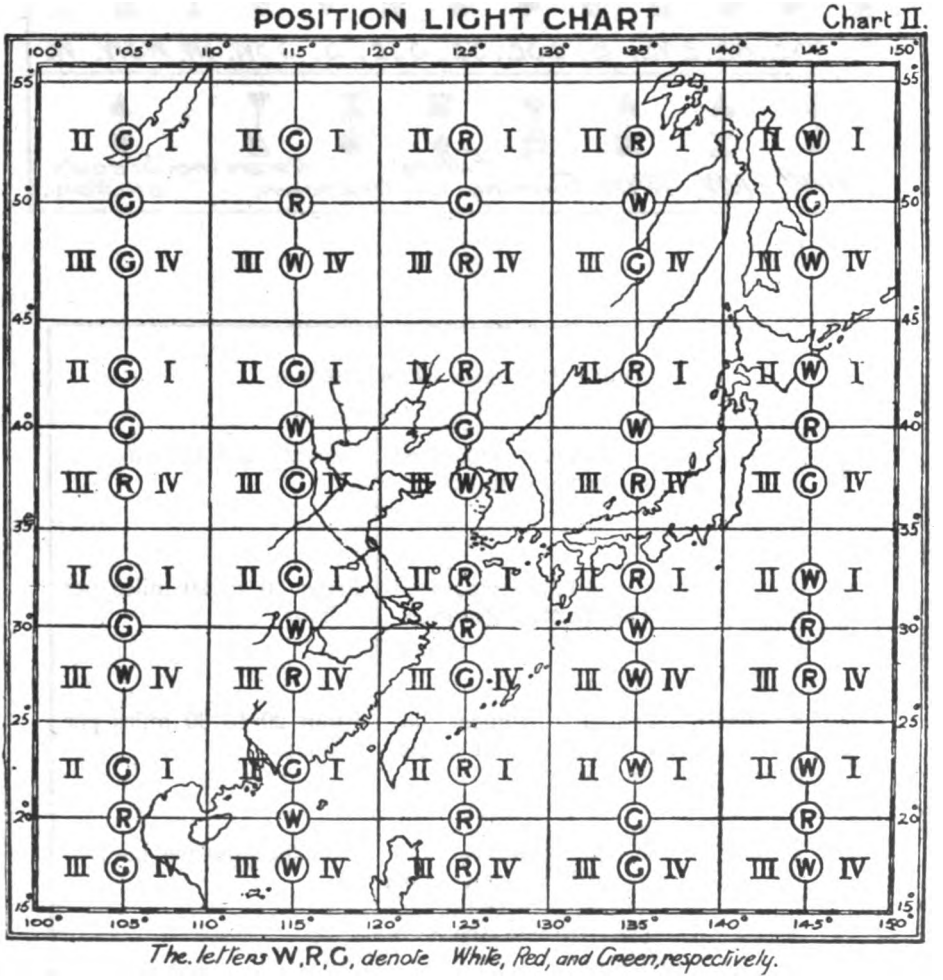
2. NIGHT SIGNALS.

(*a*) **Three lights, disposed vertically, at one yardarm, indicate the district in which the typhoon or cyclone is situated.** *See* Chart II.



(*b*) One light, or the absence of a light, at the masthead indicates the subdivision of the district in which the centre is situated. *See* Table IV. and Chart II.

TABLE IV.—Subdivision light.

1st Quadrant.	2nd Quadrant.	3rd Quadrant.	4th Quadrant.
W	R	G	None

(*c*) Two lights, disposed vertically, at the other yardarm show the direction of the motion of the centre. *See* Table V.

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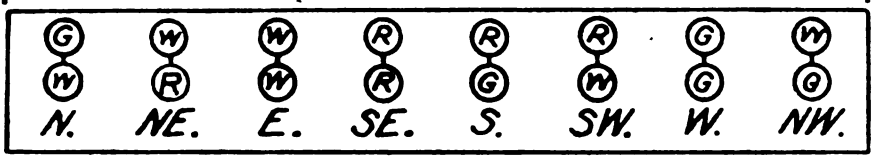
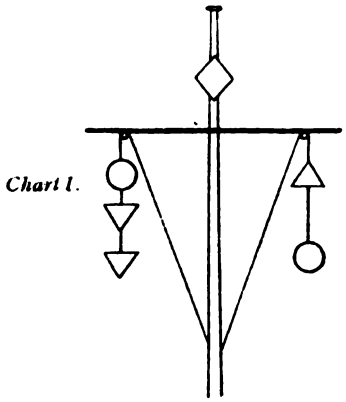
TABLE V.—Direction of motion lights.



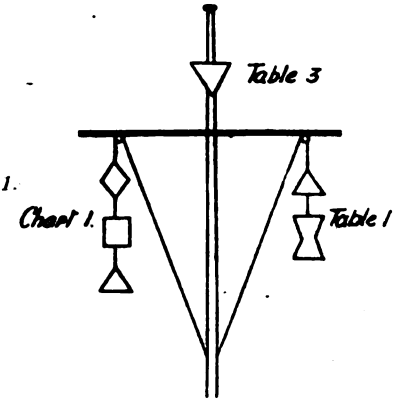
The letters (W) (R) (G) in Tables IV. and V. denote white, red, and green, respectively.

Examples of day signals.



Reading.

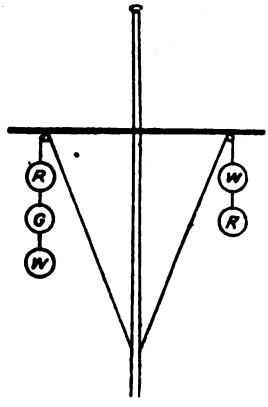
Last night, at 1800, a typhoon or cyclone off the south-east coast of Japan moving north-eastward with a velocity of 10 to 20 miles per hour, the intensity not indicated.



Reading.

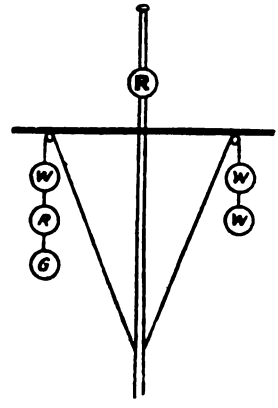
This morning, at 0600, a severe typhoon in northern Formosa moving north-westward, its velocity not indicated.

Examples of night signals.



Reading.

A cyclone or typhoon over Korea, moving north-eastward.



Reading.

A cyclone over Hokkaido, moving eastward.

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Local gale warning signals.—These signals are made by day with either a red ball, a red cylinder, or a red cone; at night by *red* lights, as follows:—

Day signals.	Night signals.	Signification.
(1) A red ball.	A *red* light.	Strong wind expected.
(2) A red cylinder.	Two *red* lights, disposed vertically.	Strong wind and rain expected.
(3) A red cone.	Three *red* lights disposed vertically.	Storm expected.

In some special local circumstances the cylinder and cone may not be exhibited, nor the weather signals given below displayed. The signals will be displayed for 24 hours after the issue of the warning, or until it has been cancelled.

Weather signals.—Flag signals are hoisted by day at certain stations to indicate the probable weather for the 24 hours following 1800 of the previous day. The flags, with their signification, are as follows:—

Signal.	*Signification.*
A white triangular flag	Northerly winds.
A green triangular flag	Easterly winds.
A red triangular flag	Southerly winds.
A blue triangular flag	Westerly winds.
A triangular flag, upper half white and lower half green	North-east wind.
A triangular flag, upper half white and lower half blue	North-west wind.
A triangular flag, upper half red and lower half green	South-east wind.
A triangular flag, upper half red and lower half blue	South-west wind.
A white square flag	Fair weather.
A red square flag	Cloudy weather.
A blue square flag	Rain.
A green square flag	Snow.
A red triangular flag	Sudden rise in temperature.
A white triangular flag	Sudden fall in temperature.
A square flag, upper part white and lower part red	Clear, occasionally cloudy.
A square flag, upper part white and lower part blue	Clear, with a little rain occasionally.
A square flag, upper part white and lower part green	Clear with a little snow occasionally.
A square flag, upper part red and lower part white	Cloudy, occasionally clear.
A square flag, upper part red and lower part blue	Cloudy, a little rain.
A square flag, upper part red and lower part green	Cloudy, a little snow.
A square flag, blue and green diagonal	Rain or snow.

Night weather signals will be made by means of *white*, *orange*, *blue*, and *green* lights, as given in the table below; should any of the terms in the weather report be wanting in the table, the signal nearest to the meaning will be hoisted.

Signal.	*Signification.*
One *white* light	Fair weather.
One *orange* light	Cloudy
One *blue* light	Rain.
One *green* light	Snow.
A *white* light above an *orange* light	Fair, cloudy later.
An *orange* light above a *white* light	Cloudy, fair later.
A *blue* light above a *white* light	Rain, fair later.
A *green* light above a *white* light	Snow, fair later.
A *white* light above a *blue* light	Fair, rain later.
An *orange* light above a *blue* light	Cloudy, rain later.
A *blue* light above an *orange* light	Rain, cloudy later.
A *green* light above an *orange* light	Snow, cloudy later.
A *white* light above a *green* light	Fair, snow later.
An *orange* light above a *green* light	Cloudy, snow later.
A *blue* light above a *green* light	Rain, snow later.
A *green* light above a *blue* light	Snow, rain later.

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The local day weather signals will be hoisted every day till sunset. The local night weather signals will be exhibited every day from sunset till 2200; in certain districts, according to circumstances, they may be exhibited till 2400 or even throughout the night.

Aircraft distress signals.—When any aircraft is in grave and imminent danger and requires immediate assistance, she will make or display one or more of the following signals :—

1. The International distress signal S O S by wireless telegraphy, as prescribed in the Admiralty List of Wireless Signals.
2. The spoken word " Mayday " by wireless telephony.
3. The International distress signal S O S by visual signalling or any sound apparatus.
4. The International Code flag signal N C.
5. The International Code distance signal consisting of a square flag having above or below it a ball or anything resembling a ball.
6. A continuous sounding of any sound apparatus.
7. A succession of *red* pyrotechnic lights fixed at short intervals or a *red* flare from which, at intervals of about three seconds a *red* light is ejected.

Urgent signals from aircraft.—An aircraft, having a very urgent message to communicate to a vessel concerning the safety of any aircraft, vessel or person, within range of assistance, will fly low around the vessel firing a succession of *green* pyrotechnic lights or will flash a succession of *green* flashes with the daylight signalling apparatus. The aircraft will then signal the message as prescribed in the International Code of Signals; or alight alongside the vessel; or, if unable to signal or alight, will fly towards the aircraft, vessel or person in distress. When the *green* pyrotechnic lights are seen from the vessel, a boat is to be prepared for lowering.

The signals from the aircraft are to be acknowledged from the vessel by flashing the answering sign, both by day or at night, with the daylight signalling apparatus; if no such apparatus is carried, the answering pendant is to be hoisted close up, by day, and, at night, a *white* light is to be waved in a position away from other sources of light.

Non-urgent signals from aircraft.—An aircraft wishing to communicate with a vessel on a matter of no urgency, will fly around the vessel to attract attention.

Signals to be made by vessels when inconvenienced by searchlights.—In the event of the navigation of a vessel being inconvenienced by the glare from searchlights near a port in the British Empire, she should make the signal Z O (— — · · — — —) of the International Code of Signals by lamp and by whistle, siren or fog horn.

Both the light and sound signals should be employed, whenever possible, and should be repeated until the inconvenience is removed.

Only real urgency should necessitate the use of this signal, as unless the vessel is actually in the rays of a searchlight, it is not possible for the operator to know which projector is affected.

This signal is designed to assist mariners; no liability whatever will be admitted.

This signal should also be used in similar circumstances near ports in other countries.

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Signals in Chinese ports.—The special signals given hereafter, made by flags of the International Code of Signals, are used at the ports of China specified :—

	Signal.	*Signification.*	*Ports where used.*
	Flag N	Berthing officer wanted.	Swatow, Woosung, Shanghai.
	Flag G	Doctor wanted.	All ports.
	Flag G, over a black ball.	Doctor urgently required.	All ports.
	Flags N Q.	Fire on board.	All ports.
	Flags S T	Police wanted.	Harbour Police at Swatow, Amoy, Ma wei anchorage, Shanghai.

GENERAL SYSTEMS OF BUOYAGE, ETC.—In the systems of buoyage, etc., for Chinese and Japanese waters, described hereafter, the term "starboard side" denotes that side which would be on the right hand for a vessel entering a harbour, channel or fairway from seaward ; the term "port side" means the left hand side under the same circumstances.

Chinese waters.—*Buoys.*—Buoys, painted red, mark the starboard side of the channel, and must be left on the starboard hand by vessels entering.

Buoys, painted black, mark the port side of the channel, and must be left on the port hand by vessels entering.

Buoys, painted red and black in horizontal bands, mark the centre of the fairway, and should be passed close-to.

Buoys, painted red and black in vertical stripes, mark the ends of spits, and the outer and inner extremities of banks, shoals, or extensive reefs, where there is a navigable channel on either side of such a danger. Vessels must not attempt to pass between a buoy thus painted and the danger it marks.

Buoys, painted in red and black chequers, mark rocks in the open sea, and also obstructions of small extent lying in channels leading from the sea to the coast, or in rivers, when they will be moored seaward of the obstruction. Vessels must not attempt to pass between a buoy thus painted and the danger it marks.

When two chequered buoys, painted red and white, and black and white, respectively, mark an obstruction, the red and white buoy marks the starboard side of the channel, and must be left on the starboard hand by vessels entering ; the black and white buoy marks the port side of the channel, and must be left on the port hand by vessels entering.

Wreck buoys are painted green, and when lighted exhibit a *green* light. When the wreck lies in the open sea or in a position where there is plenty of room on either side of it, a wreck buoy is moored to seaward of it. When the wreck lies in a river, estuary, harbour, or channel, a wreck buoy is moored on the channel side of the wreck.

Beacons.—No uniform system of colouring beacons is strictly adhered to on the coast of China, evidently owing to the variable requirements of local topographical features, etc. The topmarks used on beacons do not conform to any rigid system, but are selected to render the best visibility against topographical backgrounds.

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Beacons on land, established primarily to enable bearings to be taken of them, or leading beacons for entering rivers, harbours, or for crossing bars, etc., are painted so as to make them as conspicuous as possible.

Beacons on the sea coast which have been erected for marking reefs, rocks, etc., and which are usually built of stone, are unpainted unless it has been found necessary to add to their visibility by the adoption of a distinguishing colour.

In rivers and harbours, where beacons are provided to aid navigation through channels, fairways, etc., red beacons will usually be found on the starboard hand, and black beacons on the port hand.

Light-vessels.—Light-vessels exhibit a *white* light on the forestay, at a height of 6 feet (1^m8) above the rail, to show in which direction the vessel is riding. The hulls of these vessels are painted red, with the name of the station in white, on their sides.

Light-vessels when out of position discontinue their characteristic lights and fog signals, and show a *red* light at each end of the vessel. They will also burn a *white* and a *red* flare, or show a *white* and a *red* light, every fifteen minutes. By day, a black ball or a red flag will be shown at each end of the vessel, and the flags P C of the International Code of Signals will be hoisted.

Japanese waters.—The term "upper end" used hereafter when referring to bars and shoals means that end of the bar or shoal which is nearer the head of the harbour, bay, etc.; "lower end" means the end which is farther from the head.

Buoys.—Black conical buoys, surmounted by a cylinder, and with an odd number painted in white thereon, mark the port side of channels and fairways.

Red conical buoys, surmounted by a triangle, and marked with an even number painted in white thereon, mark the starboard side of channels or fairways.

Conical buoys, painted black and white in horizontal bands, and surmounted by a diamond, mark the lower ends of bars or shoals.

Conical buoys, painted red and white in horizontal bands, and surmounted by triangles, points together, mark the upper ends of bars and shoals.

Conical buoys, painted red and black in horizontal bands, and surmounted by a sphere, mark isolated dangers.

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Conical buoys, painted black and white in vertical stripes, and surmounted by a cylinder, mark the middle of a fairway and must always be left on the port hand. This applies to Korea only.

Wreck buoys are green, of the shape shown, and have "Wreck" painted in white letters on them.

Spar buoys, with a topmark, are occasionally employed, and when used the colour will be specially notified.

Beacons.—Beacons marking dangers on the starboard side of the channel or fairway are red.

Beacons marking dangers on the port side of the channel or fairway are black.

Beacons marking the middle of channels are painted black and white in vertical stripes.

Beacons marking isolated dangers are painted red and black in horizontal bands.

PILOTAGE.—Pilot boats of the Chinese Pilotage service are registered, and each boat is furnished with a certificate and a number. The words "Licensed Pilot-boat," with the number, are painted at the stern and on the head of the mainsail; a flag, the upper half of which is yellow and the lower half green, is flown by the pilot boats.

Japanese pilot boats are painted black, with words indicating that they are pilot boats on the sides and the upper part of the sail. When a pilot is on board they fly a square flag, the upper half of which is white and the lower half red.

The signals for a pilot are those laid down in the International Code of Signals.

W/T STATIONS.—Coastal W/T stations in the area covered by this volume, which are open for public correspondence, are established at the following places:—

China: Foochow, Shanghai, Tsing tao, Weihaiwei, Taku, Tientsin, Peiping, Chefoo.

Luzon island: Aparri, Abulug.

Batan island: Basco.

Formosa: Tainan, Taito, Karenkō, Kīrun (Keelung).

Quelpart island: Saishi yū.

Korea: Mokuho, Seoul (Keijo in list), Chinnampo.

Kwantung peninsula: Dairen.

For details of the above stations, *see* List published by the Bureau of the International Telecommunication Union.

W/T D.F. stations are established at the following places:—

Korea: Shashi tō, Shichihatsu tō.

Kwantung peninsula: Round islet or En tō, Dairen.

For details, *see* Admiralty List of Wireless Signals.

For details of W/T stations which transmit weather bulletins, storm signals, navigational warnings, time signals, etc., *see* Admiralty List of Wireless Signals.

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COAL AND FUEL OIL.—Coal is obtainable at Swatow, Amoy, Ma wei anchorage, Takao, Tansui kō (small vessels only), Kirun kō. Ningpo, Shanghai, Tsing tao, Chefoo, Tientsin, Chinwangtao, Yingkow, Mokuho, Chemulpho, and Dairen.

Fuel oil is obtainable at Swatow, Amoy, Ma wei anchorage, Takao, Tansui kō (small vessels only), Kirun kō, Ningpo, Shanghai, Tsing tao, Chefoo, Tientsin, Yingkow, Mokuho, Gunzan kō, and Dairen.

DOCKS AND REPAIRS.—There are dry docks at Amoy, Bako kō, Kirun kō, Shanghai, Tsing tao, Tientsin, Ryojun kō, and Dairen; *see* Appendix I.

Large repairs to hull and machinery can be executed at Amoy, Ma wei anchorage, Kirun kō, Shanghai, Tientsin, Ryojun kō, and Dairen. Small repairs can be effected at Swatow, Takao kō, and Chemulpho.

BRITISH CONSULAR OFFICERS.—British Consular officers are stationed at the following places:—

China: Swatow, Amoy, Foochow, Shanghai, Tsing tao, Weihaiwei, Chefoo, Tientsin, Yingkow.

Formosa: Tansui.

Korea: Chemulpho.

Kwantung peninsula: Dairen.

STANDARD TIME.—The mean time of the meridian of 120° E., or 8 hours fast on Greenwich mean time, is the standard time on the coast of China, and also for the Philippines.

In Formosa, the Pescadores islands, Manchuria and Korea the mean time of the meridian of 135°, or 9 hours fast on Greenwich mean time, is adopted as the standard time.

NATIONAL REGULATIONS.—Japanese general regulations for open ports.—The following are extracts from the Japanese general regulations for open ports:—

Vessels when entering port must hoist their national flag and their distinguishing signal in the International Code of Signals; these must not be hauled down until after the arrival of the vessel in port has been reported to the Harbour master.

The vessel's arrival must be reported to the Chief of Police within 24 hours on the prescribed Form. No vessel shall be entitled, before the presentation of such report, to enjoy facilities of Customs examination.

If a vessel which has left port returns within 12 hours of her departure on account of bad weather, for repairs, or for any other reason, she must send her reasons in writing to the Harbour master instead of the usual arrival notice.

If a vessel intends to refit, repair, or lay up in port, the Harbour master must be informed in advance.

No communication may be held with other vessels, or with the shore, until permission has been given.

The Harbour master will ordinarily meet vessels near the entrance of the port and direct them to their berths. No vessel is allowed to leave the berth assigned to her without special permission, except in case of emergency, in which case the reason for doing so must be reported without delay. The Harbour master may, however, if he deems it necessary, direct a vessel to change her berth.

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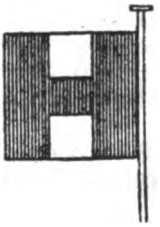
The Harbour master's boat will display a flag of the pattern shown below :—



If a vessel is damaged by accident, or sinks inside or near the limits of the port, a report to that effect must be made immediately to the Harbour master.

If deemed necessary, vessels of over 500 tons gross may be ordered to moor.

Steam vessels when within the harbour limits or near them must proceed at such a speed so as not to damage other vessels. Sailing vessels must reduce sail or proceed in tow of a tug.

Vessels must not proceed in line abreast.

Vessels intending to cross the fairway must give way to other vessels proceeding along the fairway. Vessels about to meet in the fairway must each keep to their own right side. A vessel may not overtake another vessel in the fairway.

No vessel is allowed to anchor in the fairway, or obstruct navigation in any way.

In narrow entrances, an in-coming vessel must give a free passage to an out-going vessel.

Steam boats, rowing boats, and miscellaneous craft, when within the limits of the port, must not obstruct steam vessels or sailing vessels.

When vessels are passing breakwaters, wharves, or moored vessels, they must keep close to them when they are on the vessel's starboard hand, and must give them a wide berth if they are on the port hand.

In all cases the Rules for Preventing Collisions at Sea must be observed.

Whenever a storm is expected, or when a warning signal is displayed, every vessel must at once prepare one or more spare anchors for letting go ; steam vessels are also required to raise steam.

Except in accordance with the Rules for Preventing Collisions at Sea, or in other special circumstances, vessels must not sound their whistles, sirens, or fog-horns unnecessarily.

Vessels within or near the limits of a port must not unwarrantably use searchlights, etc., which may be likely to obstruct the manœuvring of other vessels.

Vessels loaded with explosives or combustible substances in excess of the quantities for ordinary use are required to wait outside the limits of the ports for instructions from the Harbour master. Such vessels, while awaiting instructions, must display flag B of the International Code of Signals between sunrise and sunset, and must exhibit a *red* light at the foremast between sunset and sunrise. No vessel is entitled to load or unload the materials mentioned above except in the places specified by the Harbour master.

In case of outbreak of fire on board a vessel the bell must be rung continuously until assistance arrives. Between sunrise and sunset

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flags N Q of the International Code of Signals must be displayed by the vessel, and between sunset and sunrise a *red* light must be continuously raised and lowered.

When police assistance is needed flag G of the International Code of Signals must be displayed between sunrise and sunset, and a *blue* or a *flashing* light must be exhibited between sunset and sunrise. With these exceptions no gun is to be fired, nor fireworks displayed, except by permission of the Harbour master.

Vessels coming from districts notified by the Imperial Government as affected by epidemic or contagious diseases (such as cholera, small-pox, yellow fever, scarlet fever, plague, etc.), or vessels in which any of these diseases is found to have broken out in the course of the voyage, must display a yellow flag between sunrise and sunset, and must exhibit a *red* light above a *white* light at the foremast head between sunset and sunrise. The sanitary officials shall be notified of the nature of the diseases, in order that suitable preventative measures may be adopted. Vessels having disease on board must display the yellow flag, or the lights, until pratique has been obtained; they are not allowed to land any persons, or communicate with other vessels, without the permission of the sanitary officials concerned. The above provisions are also applicable to any vessels at anchor within the limits of a port, in which an epidemic disease breaks out; they are required to change their position on receipt of directions to that effect from the Harbour master.

Cattle and sheep arriving from an infected place, or which have had an outbreak of disease on board during the voyage, may not be landed or transferred to another vessel, nor their carcases, hides, or bones, without the express permission of the sanitary officials concerned.

It is strictly prohibited to cast overboard carcases, ballast, ashes or refuse within the limits of a port; vessels requiring the ash-boat must hoist flags F T of the International Code of Signals. When loading or unloading coal or ballast, or other materials of a similar nature, precautions must be taken to prevent the same from falling into the water; vessels known to have thrown into the sea any of the above-mentioned substances, or to have allowed the same to fall through negligence, shall be required by the Harbour master to remove them.

Vessels intending to leave the port must notify the Harbour master, and the "Blue Peter" must be displayed.

Japanese regulations for open ports in Korea.—The following are extracts from the Japanese regulations for open ports in Korea, and are additional to the Japanese general regulations for open ports:—

Vessels entering the port must attach to the notice of entering port a list of the passengers who will disembark, containing the name, place of residence, profession, age, number and class of cabin, place of embarkation and destination of each person.

If the Chief of Police considers it necessary, in the case of vessels which are about to leave port, he may order the list of passengers, with the particulars mentioned in the above paragraph, to be despatched to him.

When two or more vessels are proceeding into port in line, they must maintain a suitable distance apart.

Within the limits of the port vessels must not heedlessly secure to other vessels or any other object.

When vessels or other craft are being towed within the limits of the port, the number to one tow must not exceed five small boats, two

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water-boats or lighters, or one ocean-going vessel, except with special permission. Tugs may not cast off their tows in the fairway.

Japanese regulations for open ports in Formosa.—The following are extracts from the Japanese regulations for open ports in Formosa, and are additional to the Japanese general regulations for open ports :—

The open ports in Formosa are Takao, Anpin, Tansui, and Kīrun ; the limits of these ports are :

Takao.—The water area within an are drawn with a radius of 2 miles from Takao lighthouse as centre.

Anpin.—The water area within an are drawn with a radius of 2 miles from Anpin lighthouse as centre.

Tansui.—The water area within an arc drawn with a radius of 2 miles from Tansui lighthouse (Tansui kō lower light) as centre.

Kīrun.—The water area between a line drawn 062° from Banjintai bi to the north-west edge of Chūsan and a line drawn 214° from Sensan bi.

If the Harbour master considers it necessary, he may cause a vessel to take a pilot on board ; in such case the responsibility for managing the vessel still rests with the captain. Vessels which have received such an order may not alter that order, or the anchorage assigned to them, without the permission of the Harbour master ; this does not apply to cases of unavoidable necessity or danger, but in such cases the Harbour master must be informed without delay.

Without the permission of the Harbour master vessels in port may not fire rifles or rockets. When warships intend to fire salutes the Harbour master must be informed.

Vessels must not, for the purpose of mooring, make fast to any article other than the buoys or structures available for that purpose.

Regulations for Japanese Naval ports.—The following are extracts from the Japanese Naval Ports and Defended Ports Regulations :—

Art. 1.—The water area of each Naval port or Defended port is divided into three areas : the innermost part, within the first boundary line, is called Area No. 1, that within the second boundary line Area No. 2, and that outside Areas 1 and 2 is all included in Area No. 3. The limits of these areas are shown on the charts.

Art. 2.—All vessels wishing to enter Naval ports and Defended ports must signal their names by the International Code of Signals from a position 3 miles outside the port, and must keep this signal displayed until they reach their anchoring or mooring position.

Art. 3.—All vessels which are at anchor or under way in the water area of Naval ports and Defended ports, or within a distance of 3 miles outside them, must hoist their national flag.

Art. 4.—All vessels which are at anchor or under way in the water area of Naval ports and Defended ports, or within a distance of 3 miles outside them, at night must display the lights laid down in the Regulations for Preventing Collisions at Sea.

Art. 5.—Vessels arriving from abroad may not enter Nos. 1 and 2 areas until quarantine or disinfection has been completed without the permission of the Commander-in-Chief. Any vessel in which a patient contracts an infectious disease, in either Area 1 or 2, must display the quarantine flag and await the instructions of the Commander-in-Chief.

Art. 6.—Vessels may anchor anywhere in No. 3 area, provided they do not obstruct the fairway. The anchorage for vessels carrying

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explosives or inflammable materials will be specially indicated by the Harbour master.

Art. 7.—No vessel other than warships may enter Areas 1 and 2 without the permission of the Commander-in-Chief.

Art. 8.—All movements of vessels in Areas 1 and 2 must be in accordance with instructions from the Harbour master, except in cases of urgency or untoward circumstances when it is impossible to await these instructions.

Art. 9.—No foreign vessel is allowed to enter the water area of Naval ports and Defended ports at night without special reasons.

Art. 10.—The Commander-in-Chief, when necessary, may order any vessel in the port to shift berth or leave the port.

Art. 11.—If the Commander-in-Chief considers that the cargo of a vessel, which has entered or is about to enter Area 1, includes any dangerous articles he may order these articles to be landed.

Art. 12.—All vessels are prohibited from approaching the magazines within a distance of 3 cables, unless they have special permission from the Commander-in-Chief. This prohibition also applies to small craft of all kinds which have their boiler fires alight or which have any fire whatsoever alight.

Art. 13.—Within the limits of a Naval port or Defended port no fire arms or explosive articles may be discharged or detonated, except salutes, signal guns and anything else which has been permitted by the Commander-in-Chief. Furthermore, the firing of salute and signal guns is absolutely forbidden within a distance of three-quarters of a cable from any public or private house or building, except when the permission of the Commander-in-Chief has been specially obtained.

Art. 14.—In Areas 1 and 2 no fishing or trawling may be carried out, and floating or sunken objects may not be picked up, without special permission from the Commander-in-Chief. This regulation also applies where an obstruction of the fairway occurs, or where there are objects specially placed in Area 3.

Art. 15.—In Areas 1 and 2, their shores or in the rivers which flow into them, it is absolutely prohibited to throw overboard articles of any kind, except by permission of the Commander-in-Chief.

If the Commander-in-Chief considers it necessary he may prohibit the throwing overboard of articles in Area 3, and may appoint a position as a temporary dumping ground.

If a vessel finds itself unable to dispose of its own rubbish, the Harbour master should be requested to effect its disposal.

Art. 19.—Wireless telegraphy or telephony may not be used within the limits of the Naval ports or Defended ports without the permission of the Commander-in-Chief. This does not apply to the transmission of messages whilst a vessel is under way, or to signals of distress.

Art. 25.—In the case of Defended ports, the duties of the Commander-in-Chief as prescribed in these regulations will be performed by the Officer in command of the Defended port or by the Harbour master.

QUARANTINE REGULATIONS. — Chinese ports. — The following are extracts from the Quarantine regulations for Shanghai and other ports of China where the health services are under the control of the Ministry of Health at Nanking :—

The Minister may on the recommendation of the Director of Quarantine :—

(*a*) Declare that any place within or beyond the Republic of China is infected with a quarantinable disease, or that a

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quarantinable disease is liable to be brought or carried from or through that place, and thereupon, and for so long as such declaration remains in force, that place shall be a *proclaimed place* within the meaning of these regulations. Public notification of every such declaration shall be made by the issue of a harbour notification and by advertisement in the newspapers.

(*b*) Declare any port in the Republic of China to be a first port of entry for vessels coming from a proclaimed place, and require masters of such vessels bound for China to enter such a port before entering any other Chinese ports except in case of danger or for other sufficient reason.

(*c*) In consultation with the Harbour Authorities allocate quarantine anchorages for vessels subject to quarantine inspection.

The Minister of Health shall prescribe the limits within a port to be used as a quarantine anchorage.

The master of any vessel subject to quarantine inspection shall, on arrival at a port to which these regulations apply, bring the vessel to the quarantine anchorage.

The hours of quarantine inspection of vessels shall be from sunrise to sunset, and during these hours the quarantine officer shall board every vessel requiring inspection as soon as possible after her arrival. The Quarantine officer may on application inspect any vessel between sunset and sunrise if he is satisfied that the conditions on board, including lighting, will enable such inspection to be effectively performed.

The master of any vessel subject to quarantine inspection shall whenever possible, furnish the Quarantine officer with the following details by wireless at least three hours previous to her arrival at the quarantine anchorage:—

(*a*) The name of the vessel and the expected date and hour of arrival.

(*b*) The number of passengers and crew on board the vessel, and the number of passengers landing at the port.

(*c*) The name of oversea port of departure, and the name of the last port of call.

(*d*) The number of cases of infectious disease during the last 15 days, or of deaths during the voyage (stating name of diseases).

(*e*) The number and nature of any cases of non-infectious disease.

(*f*) Whether a medical officer is carried.

For the purposes of these regulations the quarantinable diseases shall be plague, cholera, smallpox, typhus fever, yellow fever, and any other disease which may be prescribed by the Minister.

The master of every vessel coming from a proclaimed place shall on arrival furnish to the Quarantine officer as complete a list as possible of all passengers on board, and the full address, where obtainable, of any person who intends to disembark at the port.

The following vessels shall be subject to quarantine inspection on arrival:—

(*a*) Every vessel which comes from a foreign port, unless exemption has been granted.

(*b*) Every vessel which comes from a proclaimed place.

(*c*) Every vessel which has infectious disease on board, or on board which a death has occurred since the last quarantine inspection.

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The master of every vessel subject to quarantine inspection shall display the quarantine signal on his vessel before she comes within 3 miles of the port and until pratique has been granted.

The quarantine signal shall be, by day, the hoisting at the foremast head of flag Q of the International Code of Signals, and at night, if in quarantine or if inspection has been arranged, the display of three *red* lights, disposed vertically, not less than 6 feet (1^{m}8) apart; when awaiting inspection three distinct prolonged blasts on the whistle should be repeated at intervals.

No unauthorised person shall go on board or alongside any vessel displaying the quarantine signal.

Except in case of danger no master of a vessel arriving at any port or place in China to which these regulations apply, and no person on board thereof, shall communicate or attempt to communicate with the shore or with any other vessel, and no person from the shore or from any other vessel shall communicate with such vessel otherwise than by signal until pratique has been granted.

A Quarantine officer may, by order in writing, order into quarantine any vessel, person, goods or articles being or likely to be infected with a quarantinable disease. When a vessel is ordered into quarantine the master thereof shall forthwith cause the vessel and all persons and goods on board the vessel to be conveyed to such mooring grounds or to such quarantine station as the Quarantine officer directs.

Until a vessel in quarantine is released from quarantine no unauthorised person shall land or unship, or move with intent to land or unship, any goods from the vessel. All persons ordered into quarantine shall perform quarantine, and for that purpose may be detained on board the vessel, or be removed to and detained in a quarantine station.

Where a vessel is ordered into quarantine in a port which has not the equipment necessary to receive it, the Quarantine officer may order the master to proceed to another port suitably equipped to carry out the necessary measures of quarantine.

Japanese Naval ports.—The following are extracts from the Naval Ports Quarantine Law:—

Art. 1.—A person who has the preliminary symptons of an infectious disease will be considered as an infectious patient for the purpose of this act.

Art. 2.—A vessel from a foreign port arriving at a port where quarantine is carried out cannot enter the port until she has obtained a quarantine certificate permitting this, nor can she communicate with the shore nor any other vessel, nor land any members of her crew or any article. If, however, there are reasons why she cannot receive quarantine inspection outside the harbour, she may receive it in a position appointed by the quarantine officials.

If, after her arrival in port, a case of, or death from, infectious disease is discovered, or if she is contaminated with posion from an infectious disease or is suspected of it, she may not proceed to another port without a certificate from the quarantine officials, nor can she communicate with the shore or any other vessel, nor land any articles or member of her crew.

Art. 4.—A vessel from a foreign port entering a port where quarantine is in force must display the quarantine flag from the time of her entering port till she receives the permit if she comes into one of the following categories:—

(*a*) Having on board a patient with infectious disease or one who has died of it.

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(*b*) Has had during the voyage a patient or one who has died through infectious disease.

(*c*) Has come from or passed through a district where infectious disease is prevalent, or has communicated with another vessel either infected or suspected of infection.

The vessel coming under paragraph (*a*) must display the quarantine flag from the time she discovers the case until she receives the permit.

Art. 5.—In the case of a vessel entering from a foreign port into a port where quarantine is not in force, if she comes under Article 4, or if she, while in port, discovers a case of, or death from, infectious disease, or of contamination with infectious posion or the suspicion of it, she must display the quarantine flag as laid down in Article 4, inform the police officials, and wait for instructions.

In the above circumstances, on receipt of orders from the police officials, she must proceed immediately to a port where quarantine is in force and undergo quarantine.

Until she receives the instructions from the police she may not proceed to another port, nor hold communication with the shore or another vessel, nor land any member of the crew, passenger or article.

Art. 7.—A vessel detained by order must remain in the place appointed by the quarantine officials, and may not shift to another berth without their permission.

Art. 13.—The information given in Article 4 does not apply to Japanese and foreign men-of-war entering a port where quarantine is in force; the captain and medical officer of such vessels must report such cases in writing to the quarantine official.

If the second paragraph of Article 2, or paragraphs (*a*), (*b*), or (*c*) of Article 4, apply to any Japanese or foreign men-of-war, the quarantine officials may restrict communication between the vessel and the shore or any other vessel, and may prohibit the landing of any members of the crew or any article. Should the man-of-war come under Article 5 the police officials may carry out the above procedure.

If there are circumstances appropriate to the second paragraph of Article 2 or to Article 5, the captain and the medical officer of the vessel must report to that effect to the quarantine or police officials.

The quarantine of a man-of-war will be carried out according to the provisions of the law, after consultation between the quarantine officials and the captain of the vessel.

Note.—The Quarantine signals to be used are those laid down in the International Code of Signals.

Formosa.—The following are extracts from the Quarantine regulations for Formosa:—

Art. 1.—Quarantine is carried out at Kīrun kō, Tansui kō, and Takao kō. When quarantine is enforced temporarily in other ports this will be promulgated.

When vessels which have received quarantine examination at Tansui kō need disinfection they will be sent to Kīrun. If the quarantine official considers it impossible for a vessel to proceed to Kīrun he may deal with the matter according to Art. 12, paragraphs 2 and 3.

Art. 2.—Diseases against which quarantine is enforced are: cholera, smallpox, scarlet fever, plague, and yellow fever. When quarantine is temporarily enforced against other infectious diseases this will be promulgated.

Art. 3.—In the case of vessels which have already received quarantine examination, and, in the course of the same voyage, arrive at another port where quarantine is enforced, the quarantine official if he considers

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that no further examination is necessary either of the passengers or crew according to the general condition of the vessel and of the previous certificate obtained, may at once hand over the permit described in Art. 2 of the Naval Ports Quarantine Law.

Art. 4.—The period of detention reckoned from the time of completion of carrying out the destruction of rats and insects is as follows :—

10 days for plague.
5 days for cholera and yellow fever.
14 days for smallpox.

In the case of vessels which have left or passed through an area where infectious diseases are prevalent, or which is suspected of having become infected with a disease, the period is reckoned from the date of departure or visit or the incident which aroused suspicion of contamination.

Although a vessel may be under detention, should the quarantine official consider there is no necessity for it, he may allow the landing of passengers and crew or of cargo.

Art. 12.—In the case of the Naval Ports Quarantine Law, Article 5, the police official may order the removal of a vessel to a port at which there is a quarantine station.

If the police official considers that the voyage of a vessel to the port where quarantine is carried out is impossible, or considers that appropriate measures can be taken, he need not send the vessel to the quarantine station, but may order the captain and crew to carry out suitable disinfection measures and to destroy the rats and insects.

In the above case, should it be considered necessary to isolate a patient, he must be kept in the appointed place.

Art. 20.—In the case of vessels arriving from Japan, Korea, Karafuto, and Kwantung province, the quarantine officials may carry out the quarantine examination after entry into port, except with those vessels which come under the Naval Ports Quarantine Law, Article 4 (a), and those which have left or called at any foreign port except one in Kwantung province.

When carrying out quarantine after entering port in accordance with the previous paragraph, the provisions of Article 3 must be carried out.

NOTE.—Mail steamers comimg from ports outside Formosa, or vessels urgently requiring to enter port, which desire to receive quarantine after sunset, should request inspection by giving three long blasts on the siren when in the positions given below :—

At Kīrun kō when near Kīrun lighthouse.
„ Tansui kō „ „ Tansui lighthouse.
„ Takao-kō „ „ the point of the breakwater near the lighthouse.

Deratisation.—In accordance with Article 28 of the International Sanitary Convention of 21st June, 1926, Deratisation can be carried out and Deratisation Exemption Certificates can be issued to vessels at the following ports in the area covered by this volume :—

China : Amoy, Shanghai.
Formosa : Kīrun kō, Takao kō.
Kwantung peninsula : Dairen kō, Ryojun kō.

CAUTIONS.—Navigation in Japanese waters.—Mariners are warned that the position with regard to liberty of anchorage in the ports and territorial waters of Japan and Japanese possessions, even on account of stress of weather or *force majeure*, is different from that obtaining in any other part of the world.

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The only waters which are freely open to anchorage are the "Open Ports"; a list of these, for Formosa, is given on page 6, for Korea on page 7, and for the Kwantung peninsula on page 3.

The only Japanese Naval ports within the area described in this volume are Bako, in the Pescadores, and Ryojun kō, in the Kwantung peninsula. Only in exceptional circumstances and after obtaining special permission are vessels permitted to enter Japanese Naval ports; the limits of these ports are shown in pecked lines on British Admiralty charts.

If it is necessary to enter a Naval port, the following procedure must be adhered to:—

(*a*) The Local authorities should be communicated with by W/T as soon as possible, the necessity for entering the Naval port should be explained and instructions asked for. No vessel is permitted to cross the outer limits of a Naval port until authorised to do so.

(*b*) If not fitted with W/T a vessel should endeavour to get into communication with the authorities by other means, but she must not cross the line indicating the limits of the port until she has received permission to do so.

(*c*) When approaching the outer limits of a naval port all vessels must display their national flag and their number in the International Code of Signals.

(*d*) The above instructions do not apply to Port Arthur (Ryojun kō), which merchant vessels may enter in daytime only.

With regard to waters other than those already referred to, the position is that foreign vessels have the right of passage but are not permitted to anchor except under stress of weather or *force majeure*. If, however, a ship is forced to anchor in such waters, the local authorities should be communicated with without delay, and instructions requested.

Masters who infringe these regulations run a grave risk of a heavy fine, or imprisonment, or confiscation of the ship or cargo.

Air lights.—Mariners are informed that lights near the coast which have been established for the use of aircraft and which may be visible from seaward, will be shown on Admiralty charts and described in the Admiralty Lists of Lights. Care should be taken that these lights are not confused with those established for the use of shipping.

Submarine vessels.—*British submarines.*—British vessels fly a rectangular red flag to denote that submarines, which may be submerged, are in the vicinity. Vessels are cautioned to steer so as to give a wide berth to any vessel flying a rectangular red flag.

If from any cause it is necessary to approach her, vessels should proceed at a slow speed until warning is given of the danger zone by flags, semaphore or megaphone, etc., a good look-out being kept meanwhile for submarines whose presence may be only indicated by their periscopes showing above water.

A submarine submerged at a depth too great to show her periscope, may sometimes indicate her position by releasing a "smoke candle," which gives off a considerable volume of smoke on first reaching the surface, or by a discharge of oil.

It must not be inferred from the above that submarines exercise only when in company with escorting vessels.

Japanese submarines.—Japanese submarines, whilst submerged and under way, exhibit a square red flag on the periscope or at the mast-head, in order to indicate their position to surface vessels.

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During the operations of submarines two B flags of the International code are displayed at the masthead or yardarm of the vessel accompanying the submarines, indicating that such submarines are operating within a radius of 5 miles. If necessary the bearing and distance with respect to the parent vessel will be indicated by signals in the International code.

When vessels recognise any such parent ship exhibiting the above described signal it will be necessary to observe closely her movements and any further signals exhibited by that vessel, and moreover to keep a sharp look-out on the surface of the sea.

Submarine cables.—The following articles are taken from the International Convention for the Protection of Submarine Telegraph Cables of 14th March, 1884:—

I. It is a punishable offence to break or injure a submarine cable, wilfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages.

This provision does not apply to cases where those who break or injure a cable do so with the lawful object of saving their lives or their ship, after they have taken every necessary precaution to avoid so breaking or injuring the cable.

V. Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view of preventing collisions at sea.

When a ship engaged in repairing a cable exhibits the said signals, other vessels which see them, or are able to see them, shall withdraw to or keep beyond a distance of one nautical mile at least from the ship in question, so as not to interfere with her operations.

Fishing gear and nets shall be kept at the same distance.

Nevertheless, fishing vessels which see or are able to see a telegraph ship exhibiting the said signals, shall be allowed a period of twenty-four hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

The operations of the telegraph ships shall be completed as quickly as possible.

VI. Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one-quarter of a nautical mile at least from the said buoys.

Fishing nets and gear shall be kept at the same distance.

VII. Owners of ships or vessels who can prove that they have sacrificed an anchor, a net, or other fishing gear in order to avoid injuring a submarine cable, shall receive compensation from the owner of the cable.

In order to establish a claim to such compensation, a statement, supported by the evidence of the crew, should, whenever possible, be drawn up immediately after the occurrence; and the master must, within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities.

The latter shall communicate the information to the Consular authorities of the country to which the owner of the cable belongs.

GENERAL DIRECTIONS.—For information regarding ocean passages the mariner is referred to the Admiralty publication "Ocean

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Passages for the World." The usual routes taken by steam vessels proceeding between Hong Kong and places in the Gulf of Pohai are given hereafter.

Vessels of low power should not attempt to proceed northward during the north-east monsoon or the typhoon season, except by the inshore passage, described on page 55. Good shelter during the north-east monsoon may be obtained at convenient distances along the coast; a list of such places will be found in Appendix V. At all times during the north-east monsoon the weather is uncertain, and strong breezes set in without any warning, sometimes lasting two or three days, or even more. Fog is similarly experienced in the early parts of the year.

Chinese junks, fishing vessels, etc., do not carry the regulation lights. Large fleets of fishing junks may be met with off the coast of China, and they very often carry no lights; as a rule they have the smallest sail forward. Large trading junks with five masts have two small sails aft.

Hong Kong to Shanghai.—When navigating along this part of the coast care is necessary at all times, as the tidal streams are very strong in places, especially in the vicinity of the Lamock islands, Amoy, the Ockseu islands, Tung yung, Tai chow lieh tao, the Chusan archipelago, and the approach to the Yangtze kiang.

From time to time vessels have stranded on out-lying islands on the coast of China between Fokai point and the entrance to the Yangtze kiang, and, in most cases, the stranding would not have occurred if attention had been paid to the necessity of constantly sounding in thick or misty weather. Many lighthouses on the islands are of considerable elevation, and often the upper parts of the islands and the lights are obscured by fog, so, as a general rule, if a light is not seen when a vessel is within its distance of visibility, she should sound at once, even if the weather is apparently quite clear, and proceed out to a safe depth, continuing sounding until the position is ascertained.

Except when northward-bound against a strong north-east monsoon, the route between Hong Kong and Shanghai is as direct as safe navigation permits, keeping from 5 to 10 miles eastward of the outer islands. If northward-bound against a strong north-east monsoon, vessels should keep as close to the coast as safety permits until northward of the Chusan archipelago.

In daylight and clear weather vessels can pass inside the Lamock islands and The Brothers; at night it is advisable to pass outside them. An indraught should be guarded against when passing South Merope with the north-going tidal stream; owing to the irregular depths in this vicinity vessels of deep draught should always pass outside Chapel island. When proceeding against the north-east monsoon vessels usually pass about 2½ miles north-westward of the Ockseu islands; thence passing fully three-quarters of a mile on either side of Turnabout island, and thence direct for Tung Yung, avoiding Tungsha. In the north-east monsoon there is a strong current setting south-westward between Turnabout island and Tung yung, and it has been known to run at a rate of from 4 to 5 knots; when approaching either of these islands from the northward, soundings give little or no indication of the vessel's position. There is an indraught into all the deep bights along this part of the coast during the north-going tidal stream.

From Tung yung a course should be steered to pass eastward of Tai chow lieh tao, passing outside all the islands lying between Tung yung and Tai chow lieh tao, and thence steering to pass about 4 miles

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eastward of Tongting, whence course should be altered northward for Steep island pass (page 250).

Vessels of moderate draught can take an inshore route from Turnabout island, steering northward from that island so as to pass eastward of Vereker rocks and the other dangers off the east coast of Chu shan, and passing westward of Pai chuen lieh tao, Matsu, and Pai sha; thence passing through the channel between Cony island and Ma chick, and south-eastward of the Piseang and Tai islands, and the Seven stars, whence the route given above should be followed for Steep island pass.

Video is an excellent landmark for vessels making for Steep island pass, especially from the southward. If, owing to thick weather, vessels pass outside all the islands of the Chusan archipelago, they must also pass eastward of Tung tao, giving these islets a wide berth, and it is then difficult to obtain the vessel's position again.

Inshore passage.—Vessels with a draught of not more than 22 feet (6m7) can take the inshore passage given hereafter, by which much of the heavy sea caused by the north-east monsoon is avoided.

Passing about half a mile southward of Fokai point a vessel should steer eastward for Chilang point, passing northward of Pauk Piah and about one mile southward of Reef islets. Thence she should pass about 3 miles southward of Siki and shape course towards Breaker point, taking care to give Kupchi point a wide berth to avoid the rocks lying off it. From Breaker point the vessel should steer to pass about 2 miles south-westward of Good Hope cape, and thence steer north-eastward to pass northward of Plat islet and between Three Chimney bluff, the south-eastern extremity of Namoa island, and Half-tide reef; thence southward of Bell islet, and westward of Cliff and Square islets, to Kau li tau shan or Thunder head.

A small vessel, from the position 2 miles south-eastward of Good Hope cape, can steer for Brig island, passing eastward of Dove rock, and thence through the passage northward of Namoa island, which has a least depth of 2¾ fathoms (5m0) in the fairway; thence pass northward of Dioyu reef and between Bell islet and Cliff islet as directed above.

From Kau li tau shan the vessel should pass eastward of Rees rock and through Rees pass; thence pass north-westward of Gu, Flying Fish, and Ching rocks, about half a mile south-eastward of Hut islet, which lies off Tagau point, and eastward of Baker rock, Spire islet, and Outer Cleft islet, thence giving Cork point a berth of about one mile. A small vessel can also pass inside the islets and rocks which lie between Tagau point and Cork point by proceeding through Blakeney pass (page 82).

Thence she should proceed between House hill point and the reef which extends north-westward from Lamtia islet, passing south-eastward of Lim chin su or Notch islet, between Chapman patch and North Merope, and thence past Chinha point. The vessel should cross the entrance to Amoy harbour and pass fully 2 miles south-eastward of Dodd island to avoid the 2½-fathom (4m1) patch which lies about 1½ miles eastward of that island, and then steer so as to pass the coast near Chimmo point at a distance of not less than one mile. Dodd passage (page 99), between Dodd and Kimoi islands, can also be used.

After crossing the entrance to Chimmo bay the vessel should steer to pass fully one mile off Pyramid point and Rogues point. Thence she should pass westward of Sorrel rock, across the entrance to Pinghai bay and eastward of Ping rock. The vessel should then proceed

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through Lam Yit channel (page 106), into Singwha channel by the passage between Passage islands and Wilshore island as directed on page 109, and through Hai tan strait, which should be entered by the South entrance (page 116). After passing through Hai tan strait she should steer to pass south-eastward of the Tessara islands and about one mile eastward of Chi hsing chiao (Outer Min reef), and thence between Spider island and Cony island.

Another route, instead of proceeding through Lam Yit channel and Hai tan strait, can be taken by passing between the north-western Ockseu island and Loutz island, giving the latter a berth of about 4 miles; thence pass about 3 miles southward of South Yit, Scattered Yits, and Sedan rock. When the eastern extremity of Kwing island bears about 013°, and is open eastward of the Lochinvar islets, the vessel should steer northward so as to pass inside Turnabout island, guarding against being set on to South reef and Haitan shoal, and thence pass about 4 miles eastward of Kwing island, so as to avoid Vereker rocks. She should continue northward, passing eastward of Bassett rock, to a position about one mile eastward of Chi hsing chiao, whence proceed as previously directed.

The route then runs through Seaon channel, observing that caution must be exercised when passing between Spider island and Double Peak island, as less depths have been reported, in 1935, than indicated on the chart. Thence the vessel should proceed eastward of Fu yan and westward of the Incog islands, and steer direct for Tung kua yu (Shroud island), passing eastward of Pingfong island and Farmer rock, and about 4 miles westward of Turret islet. Pass between Tung kua yu and Pei lung shan, and thence proceed through Hei niu wan (Bullock harbour), leaving it by Tung pei men, the eastern passage (page 214); then she should proceed between Ta chih yu and Tung tou shan, taking care to avoid Ching chiao and the other dangers off the eastern side of the latter island. At night, the vessel should pass well clear southward of Ta chih yu and eastward of Hu tou yu. A small vessel, instead of passing through Hei niu wan, can proceed through Tung tou strait (page 215), in which there is a least depth of $1\frac{3}{4}$ fathoms ($3^{m}2$).

Thence the vessel should pass between Taluk and the northernmost of the Seoluk islands, holding the Taluk side of this channel, pass south-eastward of the south-eastern of the two islets lying south-eastward of San shi, and south-eastward of the Stragglers and Soudan island. A small vessel with local knowledge can pass westward of San shi, the islet about one mile northward of it, and Shetung.

Instead of passing westward of Tung kua yu a vessel can, after passing Turret islet, pass northward of Namki, southward and eastward of Piki shan, eastward of Hu tou yu, and thence about 2 miles eastward of Soudan island. Or pass about $1\frac{1}{2}$ miles eastward of Tung kua yu and then proceed northward of Pei hsing by keeping Tung kua yu bearing 246° astern.

After passing Soudan island the vessel should steer to pass fully one mile eastward of Chiku shan (Chikkok), and then steer north-north-eastward to pass about 2 miles eastward of Pai chia shan (Crate island) and Tung chu, and about the same distance eastward of Tan tou shan (Tan tau san). Thence she should proceed through Nu pi shan channel (page 233), and follow the directions for the Inshore passage given on pages 258 to 264.

A vessel drawing more than 20 feet ($6^{m}1$) can pass outside Chin shan lieh tao (Kue shan islands) and thence proceed through Steep island pass, following thereafter the directions given on pages 297, 298.

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CHAPTER II.

FOKAI POINT TO AMOY, INCLUDING PORT SWATOW AND AMOY HARBOUR.

Chart 3002.

COAST.—Fokai point (*Lat. 22° 33′ N., Long. 114° 55′ E.*), on the eastern side of the approach to Bias bay, described in China Sea Pilot, Vol. I, is the south-eastern extremity of a promontory 670 feet (204m2) high, connected to the mainland by a low, sandy isthmus; from a distance the promontory appears as an island when seen from eastward or westward. A fort stands on a hill on the south-western extremity of the promontory. Three rocky islets lie off the eastern side of the isthmus.

A signal station, consisting of a circular tower with a white mast in front of it, is situated on the promontory and about one mile west-north-westward of Fokai point; this tower is conspicuous on bearings between east and north, as it is then on the skyline, but it is obscured on bearings between north and west.

Harlem peak, nearly 8 miles northward of Fokai point, is conspicuous. *See* view facing page 62.

Dangers.—A rock, with a depth of less than 6 feet (1m8), lies 3 cables north-eastward of the northern of the three rocky islets mentioned above, and a reef awash lies about three-quarters of a mile east-north-eastward of the same islet. A sunken rock lies nearly 7 miles north-north-eastward of Fokai point and about 1¾ miles offshore.

Chart 3459.

Sam chau inlet.—The entrance to this inlet lies about 9 miles north-north-eastward of Fokai point. The southern entrance point is low and flat, except for a small hillock on it, named Tung pan shan; Hsi hu or Entrance island lies 1¾ cables eastward of this point, with drying reefs between. Tung hu or Coast island lies about three-quarters of a mile eastward of Tung ching chueh, the north-eastern entrance point, and is fringed by a narrow reef; there are some reefs between this island and Tung ching chueh.

Wai chia or Outer bank extends about half a mile southward from Tung ching chueh; Fei hoo bank, with a least known depth of 9 feet (2m7), lies about three-quarters of a mile south-eastward of Tung ching chueh. The bottom on both these banks is rocky. Nei chia or Inner bank lies westward of Tung ching chueh; the deepest and widest channel lies along the eastern side of this bank.

Directions.—Vessels should not enter Sam chau inlet without local knowledge, and, as the tidal streams may attain a rate of 5 knots, it is advisable to enter at high water. The following directions, used

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Chart 3459.

in 1930, may assist the mariner, but it should be borne in mind that considerable change may have taken place to the banks at the entrance, and also farther inside, since that date.

From a position about half a mile south-eastward of Hsi hu steer for Tung ching chueh bearing 338°, subsequently steering a west-north-westerly course so as to pass fairly close north-eastward of Hsi hu; an 18-foot (5m5) patch lies about half a cable north-eastward of the east point of this island. When the summit of Hsi hu bears 179°, keep it astern on that bearing, which leads between Wai chia and Nei chia banks. After passing Tung ching chueh a mid-channel course should be steered until between Tung pao tai and Hsi pao tai; these two points lie about a mile north-westward of Tung ching chueh, on the northern and southern sides of the inlet, respectively, and each has the ruins of a fort on it. A patch, with a least depth of 16 feet (4m9), lies about one cable north-eastward of Hsi pao tai. After rounding Tung pao tai steer for the summit of Pai hu chau, an islet at the junction of the Ta Chau and Sam Chau reaches, nearly one mile north-westward of Tung pao tai, bearing 323°; good anchorage can be obtained when nearly 3½ cables from this islet.

Chart 3026.

Ross head.—Outlying islets and dangers.—Ross head is situated about 2¾ miles north-eastward of Tung hu and rises about one mile inland to Ross peak.

Pedro Blanco, bearing 174°, distant 2½ miles. (Original dated 1935).

Pedro Blanco or Tai sing cham (*Lat. 22° 19′ N., Long. 115° 07′ E.*) is a rocky islet lying about 18 miles south-eastward of Fokai point; it has a white summit, and when seen from the southward it appears as two rocks.

Whale rock, awash, and on which the sea sometimes breaks, lies about 6 miles east-south-eastward of Fokai point; it is in two parts and is steep-to.

Pauk Piah, about 2½ miles northward of Whale rock, is a flat rock about 25 feet (7m6) high.

Tung ting, about 6 miles south-eastward of Ross head, is a rocky islet about 50 feet (15m2) high, with above water and sunken rocks around; the sunken rocks lie up to a distance of nearly half a mile southward and south-eastward of the islet.

Si ting lies about 1½ miles north-westward of Tung ting and is a similar islet.

Sunk rock, with a depth of less than 6 feet (1m8), lies about 1½ miles north-westward of Si ting, and often breaks. Mace point, at the head of Hong hai bay (chart 1962), open north-westward of Hat islet, bearing about 053°, leads north-westward of Sunk rock.

Single rock, about 4 miles eastward of Sunk rock, is awash and only breaks at low water or when there is a heavy sea. A rock, with a depth of 2 fathoms (3m7) over it, lies about half a mile north-eastward of Single rock.

Owing to the imperfect nature of the survey of Hong hai bay and approaches, great caution must be exercised when navigating northward of the line joining Fokai point and Tsiech point, about 27 miles east-north-eastward, as further dangers may exist.

Charts 2661b, 1262, 1263.

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Chart 1962.

Hong hai bay.—Islands and dangers.—Hong hai bay lies between Ross head and Tsiech point, and its shores are indented by several shallow inlets. Caution is necessary when approaching this bay at night in fine weather, as it is then usually crowded with fishing junks; there is usually a long ground swell.

Inside island (chart 3026) lies about 5¼ miles north-eastward of Ross head and three-quarters of a mile offshore; some detached rocks lie up to 3 cables south-westward of its southern extremity, and a rocky patch, with a depth of less than 6 feet (1m8), lies 4 cables eastward of the island. A large stream, with a depth of 6 feet (1m8) over the bar, flows into the bay about 3 miles westward of Inside island. Hat islet, about 2½ miles south-eastward of Inside island, is a peaked rock with detached rocks around. Hong hai, nearly 2½ miles eastward of Hat islet, affords some shelter from southerly winds on its northern side, in a depth of 4 fathoms (7m3); two rocks, which dry, lie about 3 cables south-south-eastward of its south-east point.

Shoal bay, in the middle of the northern shore of Hong hai bay, is entered between Mace point, situated about 2 miles northward of Hong hai, and Club point, about 2½ miles eastward; the general depths in this bay are less than 2 fathoms (3m7). There is an inlet in the north-eastern part, from which a channel, navigable for small boats, communicates with Hie che chin bay (page 60).

Chart 1962, plan of Tai sami.

Tai sami inlet penetrates the eastern shore of Hong hai bay, and the entrance channel, situated 7 miles eastward of Club point, is about half a mile wide, with a least depth of 2¼ fathoms (4m1) in the fairway. The northern side of the approach is shoal, and Anlan rocks, which dry, lie about 1¾ miles north-westward of Fort point, the southern entrance point of the inlet. A sandbank, with depths of less than 2 fathoms (3m7), extends fully 1½ miles westward from Fort point, and closes the shore near Tai sami head (chart 1962), situated about 2 miles southward of Fort point; a 5-foot (1m5) patch lies just within the north-western extremity of this bank. Northward of Fort point the depths in the channel increase to 4 fathoms (7m3) and over, but its width decreases to about 1½ cables; within the entrance, for over a mile near the southern shore of the inlet, there are depths of from 3 to 6¾ fathoms (5m5 to 12m3). There is a Roman Catholic church and a post office at Tai sami, a settlement on the northern side of the entrance; it is also connected to the telephone system.

Chart 1962.

In the north-east monsoon sheltered anchorage can be obtained westward of Tai sami head, but a long, heavy swell rolls in. Tai sami mound is an artificial cone on the highest part of the hills about 2 miles north-westward of Tsiech point.

Chart 1962, plan of Goat island.

Goat island.—Anchorage.—Goat island, about 8 miles south-eastward of Tsiech point, is situated near the extremity of a rocky spit extending fully 1½ miles in a southerly direction from the coast about 2 miles eastward of that point; foul and rocky ground extends about 6 cables southward of the island, and a rock, which just uncovers, lies about 1½ miles south-westward of the west point of the island.

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Chart 1962, plan of Goat island.

In the north-east monsoon fairly sheltered anchorage can be obtained between Tsiech point and Goat island.

Charts 958, 1962.

Coast.—Light.—Siacheng (Chiap cheng) is a walled town situated about 3¼ miles north-eastward of Tsiech point and 1¾ miles inland.

Chilang point, about 10½ miles east-south-eastward of Tsiech point, is of red sand and rugged rock; a conspicuous boulder, 103 feet (31m4) high, stands a quarter of a mile northward of the point. The land for some distance on either side of Chilang point is a remarkable red colour, with black mounds. Chilang rock, 110 feet (33m5) high, is separated from the point by a narrow passage, which is not navigable. During the north-east monsoon there is good anchorage 2 cables westward of Chilang point, in depths of from 6 to 7 fathoms (11m0 to 12m8), sand and mud, but caution must be exercised, as the tidal streams are strong, and the depths decrease rapidly close inshore; the conspicuous boulder, which has a whitewashed mark on it, in line with a smaller boulder south-westward, bearing 044°, leads to the anchorage. The lighthouse on Chilang rock in line with a whitewashed boulder close below it, bearing about 132°, is a mark for letting go the anchor.

Light.—A light is exhibited, at an elevation of 160 feet (48m8), from a white circular stone tower, 66 feet (20m1) in height, on the summit of Chilang rock (*Lat. 22° 39′ N., Long. 115° 34′ E.*).

Off-lying islets and dangers.—Numerous dangers lie off the coast between Goat island and Chilang point, and only the outer ones will be described. A rock, and a sunken rock on which the sea breaks, lie about one and 1¼ miles, respectively, eastward of Goat island.

Reef islets lie about 3 miles south-eastward of Goat island, and are surrounded by reefs to a distance of from one to 2 cables.

Middle reef, awash, lies about midway between Goat island and Chilang point and about one mile offshore. The passage inshore of this reef should not be attempted.

Flat rock, about 10 feet (3m0) high, lies 1¾ miles westward of Chilang point; there are sunken rocks and rocks above water between it and the coast northward.

Chart 958.

Hie che chin bay.—Hie che chin bay is entered between Chilang point and Tongmi point, about 14½ miles north-eastward, and has depths of about 10 fathoms (18m3) at the entrance, decreasing regularly towards the shore. The shores are densely populated, Kieshi, on the eastern side, being the principal place. In moderate weather the bay and its approaches are crowded with fishing boats.

The land at the head of the bay is mostly flat and swampy, and two small rivers discharge here. Mount Simpson is the highest summit of a range on the western side of the bay. Two ranges of hills rise within the north-eastern shore, terminating westward in the well defined Round mountain, and south-eastward in Nipple mountain.

Paukshao point, on the western side of the bay, and about 6 miles northward of Chilang point, is the north-eastern extremity of Paukshao peninsula. Paukshao bay, on the north-western side of this peninsula, is shallow, and a large area at the head of the bay dries; it is encumbered with numerous rocks and islets, the most important being

Charts 2661b, 1262, 1263.

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Chart 958.

the Gleig islets, close off the north-western shore and about 3 miles north-westward of Paukshao point.

Kinsiang point, 8 miles north-eastward of Paukshao point, is formed by a conspicuous hillock. There are numerous villages in the neighbourhood, and vessels not exceeding 10 feet (3m0) in draught can anchor half a mile north-westward of the point.

Chino bay lies between Kinsiang point and a point about 1¼ miles north-westward of Tongmi point; it is encumbered by numerous scattered rocks and shoals, described below, and the muddy discoloration of the water prevents many of them being seen. Landing can be effected in most parts of the bay during the north-east monsoon. A conspicuous block of granite, elevated 60 feet (18m3), stands on a hummock on the shore nearly 4 miles northward of Tongmi point.

Tongmi point is the southern extremity of a promontory rising to its greatest elevation in Chino peak, a conspicuous, sharp, rocky summit situated close to the coast about a mile north-westward of Tongmi point.

Islets and dangers in Hie che chin bay.—Kinyu islet, nearly 4 miles north-eastward of Chilang point, is rugged, and terminates northward in a precipitous rocky summit, 87 feet (26m5) high; a rocky islet lies about a cable eastward of its northern end.

White rock, with foul ground around, lies nearly 1¼ miles southward of Paukshao point and 3 cables offshore; a rock, with a depth of 1¾ fathoms (3m2), lies 1¼ cables northward of this point.

On the northern side of Chino bay there is much foul ground and several remarkable precipitous rocks, including West White stone, situated about 2¼ miles south-eastward of Kinsiang point, East White stone, with perpendicular sides, and Double stone; Yellow stone lies nearly 2¼ miles south-eastward of West White stone. West White stone, East White stone and Yellow stone show up conspicuously when approaching from the southward. Sarah Lucy rocks, 1¼ miles south-eastward of Yellow stone, are two pinnacles with a depth of 2 feet (0m6), over which the sea seldom breaks. Bassard rock, nearly 1¼ miles southward of Yellow stone, is a pinnacle with a depth of 6 feet (1m8), and does not break. Arnold rocks, about half a mile south-eastward of Bassard rock, are two pinnacles, one cable apart, each having a depth of 2¼ fathoms (4m6). Chino reef, partly awash, extends nearly 3 cables from the coast about 1¼ miles north-westward of Tongmi point.

Siki (*Lat. 22° 42′ N., Long. 115° 47′ E.*), about 3 miles south-westward of Tongmi point, is a rugged islet with two granite hummocks. A 6-fathom (11m0) patch lies fully one mile southward of Siki, and the vicinity should be avoided, as the rocks off this coast are of a pinnacle nature. Simpson rock, half a mile north-westward of Siki, has a least depth of 3 fathoms (5m5).

Tungki rocks, about 1¼ miles south-eastward of Tongmi point, consist of several black rocks, the highest being 20 feet (6m1). Suwonada rock, about three-quarters of a mile south-eastward of Tongmi point, is a pinnacle with a depth of 2¼ fathoms (4m6). A group of rocks above water, one of which, Thumb rock, is 15 feet (4m6) high, lies about half a mile eastward of Tongmi point. Vessels should not attempt to pass between Tungki rocks and the coast northward.

Anchorages.—Anchorage, protected except from southerly winds, can be obtained in Hie che chin bay, choosing a berth on either side of

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Chart 958.

the bay according to the prevailing monsoon; vessels of deep draught, however, must anchor well out in the bay. During the north-east monsoon the swell is felt throughout the bay.

There is good anchorage for vessels of moderate draught north-westward of Paukshao point, protected except from northerly and easterly winds.

During the north-east monsoon there is good anchorage for vessels of light draught in Chino bay, with Yellow stone bearing 280°, distant about 8 cables, in depths of from 3 to 4 fathoms (5m5 to 7m3), mud; in order to avoid Arnold and Bassard rocks, a vessel should approach this anchorage by steering for Yellow stone bearing more than 000° until three-quarters of a mile from it, when steer north-eastward for the anchorage. There is also convenient anchorage for vessels of light draught, during the north-east monsoon, about 1¼ miles north-westward of Chino peak.

Coast.—Dangers.—Black rock point is situated nearly 5¾ miles north-eastward of Tongmi point; Black rock, 30 feet (9m1) high and conspicuous, lies 1½ cables off the point. Parry rocks, about 1¾ miles south-westward of Black rock point and one mile offshore, have a least depth of 2 fathoms (3m7) over them.

Chart 1962.

Hutung point, about 2¾ miles eastward of Black rock point, has a fort on it, and close to the fort is a conspicuous dome-shaped building like a large beehive; *see* view on chart 1962. Close westward of the point is the mouth of the Hutung river, which has a depth of 6 feet (1m8) over the bar. A small islet, surrounded by reefs and rocks, lies about a mile south-eastward of Hutung point; one of these rocks, named Figure rock, is peculiar in shape when seen from the eastward.

Chart 811, plan of Kupchi point anchorage.

Hutung peak, about 3 miles north-eastward of Hutung point, and Knob peak, a short distance farther north-eastward, are conspicuous; *see* view facing this page. A ridge of hills runs south-eastward to the coast from Hutung peak.

A flat rock, 9 feet (2m7) high, with sunken rocks around, lies nearly 1¾ miles south-eastward of Hutung peak and half a mile offshore. The coast for 2½ miles north-eastward of the flat rock is fringed by rocks above water and sunken rocks; the outermost of these, with a depth of less than 6 feet (1m8), lies nearly 2 miles east-north-eastward of the flat rock and 8 cables offshore.

Kupchi point anchorage.—Danger.—Kupchi point is situated about 8 miles eastward of Hutung point and has a rugged summit; a ruined fort stands on the coast about 3 cables north-westward of the point. Kupchi islet lies about 4 cables southward of Kupchi point, with foul ground between; some rocks above water and sunken rocks lie within a distance of half a mile southward and eastward of the islet. Turtle rock lies about one mile southward of Kupchi islet, and two rocks above water lie about 4 cables northward and north-eastward of Turtle rock, respectively. Balfour rock, with a least depth of 2½ fathoms (4m6), lies nearly 1¼ miles south-eastward of Kupchi islet, and a 4½-fathom (7m8) patch lies a quarter of a mile westward of Balfour rock. The bottom in this locality is very uneven, and vessels should pass not less than half a mile southward of Turtle rock and Balfour rock.

Charts 2661b, 1262, 1263.

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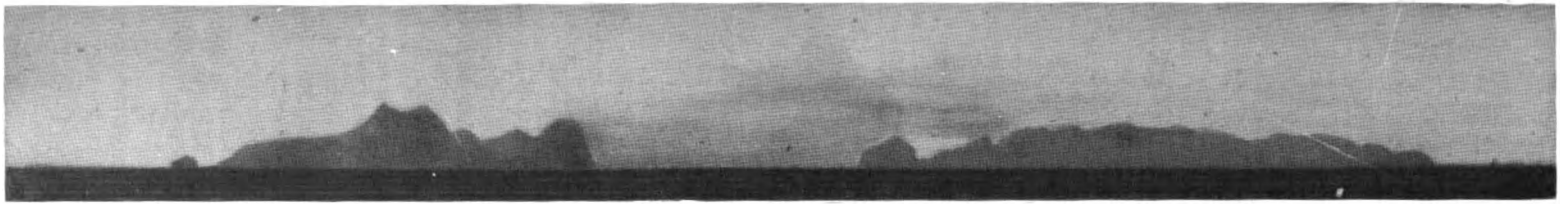
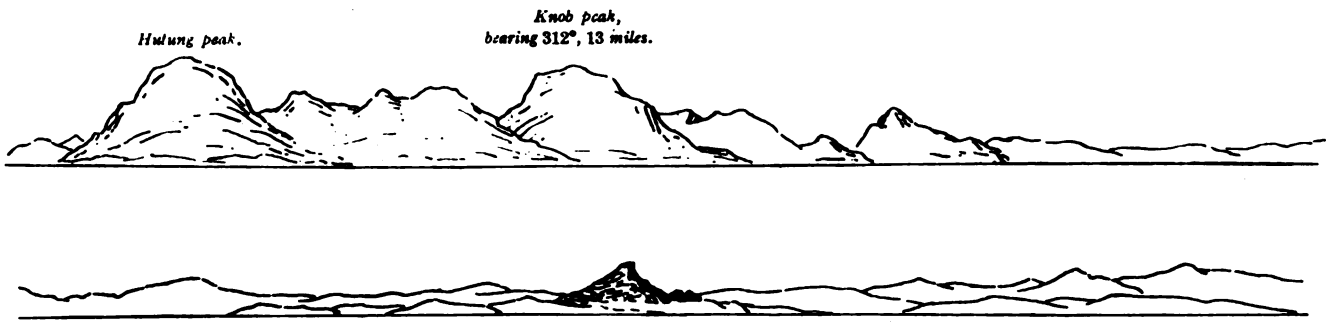


Mendoza island. *Harlem peak, bearing about 017°, distant 30 miles.* *Fokai point.*

Fokai point and adjacent coast from southward.

(*Original dated 1845*).



Two views of coast near Kupchi point.

(*Originals dated 1935*).

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To face page 63

High Lamock.
Lighthouse bearing 260° 8 miles.

East Lamock.

North rocks.

Lamock islands from eastward.

(Original dated 1935).

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Chart 811, plan of Kupchi point anchorage.

A river, on the western side of which is the walled town of Kapchi (Kiahtsz), flows out about 2 miles north-westward of Kupchi point. There are two forts on the eastern side of the entrance, and one on the western; a two-storied pagoda stands inside the entrance and about one mile northward of the western fort. Shag rock (*Lat. 22° 50′ N., Long. 116° 05′ E.*), about 7 cables southward of the western fort, is 4 feet (1m2) high; a 1½-fathom (2m7) patch lies about half a mile westward of the rock.

During the north-east monsoon small vessels can obtain anchorage about 4 cables south-westward of Shag rock, but there is usually a heavy ground swell.

Chart 1962.

Coast.—Dangers.—The coast between Kupchi point and Tungao village, about 15 miles north-eastward, is low and sandy. Black mount, about 4 miles north-westward of Kupchi point, is a black conical hill rising from red sand dunes (*see* view facing page 62); it is a conspicuous landmark and can often be seen at night. Reefs extend half a mile from the coast in its vicinity.

In December, 1904, the s.s. *Workfield*, drawing 24 feet (7m3), reported having struck an obstruction, probably a rock, lying about 4½ miles south-eastward of Kupchi point.

Chart 811, plan of Breaker point anchorage and Tungao road.

Tungao road.—Danger.—A river flows into the sea about 14 miles north-eastward of Kupchi point; the sea breaks on its bar at low water. A pagoda stands on the eastern entrance point, and there is another pagoda on a hill about 2 miles northward. Tungao village is situated on the coast about a mile south-eastward of the eastern entrance point of the river.

White rock, about 3½ miles south-eastward of the eastern entrance point of the river and a quarter of a mile offshore, is 20 feet (6m1) high, with a white top, and is conspicuous when seen from the south-westward. Hai lung, a rock with a depth of 1½ fathoms (2m7), lies about 1¼ miles southward of White rock.

Tungao road affords fairly good anchorage in the north-east monsoon, with good holding ground, but a heavy swell often sets in from the southward. The best position is with the pagoda on the eastern entrance point of the river bearing 338°, in a depth of 5¼ fathoms (9m6).

Breaker point anchorage.—Dangers.—Breaker point is situated about 8½ miles eastward of Tungao village; Dome hill rises from a red sand dune on the point; Round hill is situated about 2½ miles northward of the point. *See* view on chart 1962. Breaker point and the coast eastward is fringed by above water and sunken rocks, including one 25 feet (7m6) high, up to a distance of half a mile, and similar dangers extend fully 2 miles south-westward from the point; Korea rock, with a depth of 2 fathoms (3m7), lies near the outer end of the latter dangers. Sunk rock, with a depth of 7 feet (2m1), lies about half a mile north-north-westward of Korea rock, and foul ground extends nearly half a mile westward of the former. Black rock, 10 feet (3m0) high, and Flat rock, 8 feet (2m4) high, lie about three-quarters of a mile north-north-eastward and north-eastward, respectively, of Korea rock. The 25-foot (7m6) high rock off Breaker point in line with the lighthouse, bearing 055°, leads close south-

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Chart 811, plan of Breaker point anchorage and Tungao road.

eastward of the dangers extending south-westward from Breaker point; at night Breaker point light should bear less than 050°.

An islet, 52 feet (15m8) high, lies about 2 miles westward of Breaker point and half a mile offshore. In the north-east monsoon fairly good anchorage can be obtained half a mile west-south-westward of this islet, in a depth of 5½ fathoms (10m1), with Dome hill in line with the islet, bearing about 076°. A vessel approaching this anchorage from the southward should steer for a remarkable square stone, situated on the coast about 3½ miles westward of Breaker point, bearing more than 320°, which will lead westward of Korea and Sunk rocks.

Light.—Fog signal.—A light is exhibited, at an elevation of 154 feet (46m9), from a circular tower, painted black and white in horizontal bands, 120 feet (36m6) in height, situated about three-quarters of a mile eastward of Breaker point; the dwellings and boundary wall of the lighthouse are white.

A fog signal is sounded from the lighthouse (*Lat. 22° 56′ N., Long. 116° 30′ E.*)

Chart 1962.

Coast.—Dangers.—Tong lai point is situated about 4 miles north-eastward of Breaker point lighthouse, and nearly 1½ miles farther north-eastward is Rocky point; numerous rocks above water and sunken rocks lie off the coast between these two points, the outermost being a sunken rock about 6 cables south-eastward of Tong lai point.

About one mile westward of Tong lai point is the entrance to a creek leading to the walled town of Chonghai (Tong lai); on the eastern side, near the entrance, is a remarkable dome-shaped tower and a low, square fort.

A headland, fringed by reefs, is situated about 4½ miles northward of Rocky point, and Haimung bay lies between it and Haimung point, 7 miles north-eastward. On the summit of a hill, 600 feet (182m9) high, situated about 1½ miles northward of Haimung point, is an artificial mound. A pagoda stands on a hill about 6½ miles northward of Haimung point, and another on a hill about 7½ miles north-north-westward of the same point; West peak is situated about 2½ miles westward of the western pagoda. Haimung river, with a depth of 10 feet (3m0) on the bar, flows into the northern part of Haimung bay; on the eastern bank, about a mile within the entrance, is the town of Haimung, and northward of the town the river turns westward. There is communication by a channel with Han river (page 65). Haimung bay is not recommended as an anchorage, but sailing vessels beating against the north-east monsoon may sometimes find it convenient to anchor there, to avoid being driven back round Breaker point.

Parkyns rock, about one mile south-south-westward of Haimung point, is divided into two parts; the sea only breaks on them when there is a heavy swell. A rock awash lies about 9 cables south-westward of the eastern entrance point of Haimung river.

Caution.—In thick weather, when neither the low white sandy shore of Hope bay nor Namoa island have been visible, vessels have on many occasions mistaken Haimung point for Good Hope cape (page 64); the point and the cape much resemble each other, both having three distinct high points with sandy beaches between.

Charts 1968, 2661b, 1262.

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Charts 1957, 1962.

Hope bay.—Dangers.—Hope bay lies between Haimung point and Tide point, about 8 miles north-eastward; during the rising tide there is often a heavy tide race off the latter point. The western shore of the bay must be given a berth of fully one mile, as detached rocks lie within this distance for about 3½ miles northward of Haimung point. Peaked rock lies off the western entrance point of a small bay close westward of Tide point, and 4 cables south-westward of this rock is Cockchafer rock, a pinnacle with a depth of 4 feet (1m2) over it; a fort, with a large tree near it, stands on the eastern entrance point of this bay, and sunken rocks extend one cable from this point. Secure anchorage can be obtained in this bay during the north-east monsoon by vessels with local knowledge.

Chart 854.

Ta ta pu creek is entered about 1½ miles north-westward of Peaked rock, and runs in a north-westerly direction to unite with Han river; the creek has a depth of 1½ fathoms (2m3) over the bar at the entrance. A ruined fort stands on a hill on the eastern side of the entrance. A reef extends nearly 3 cables from the coast close southward of the fort. East islet and West islet are situated off the entrance to the creek, and Tortoise island lies about 1½ miles above the entrance.

The bar requires great caution, and the channel is narrow and intricate throughout. Large fishing junks approach with the entrance on a north-easterly bearing, and pass close south-eastward of East islet.

PORT SWATOW AND APPROACHES.—Coast.—Light.—Good Hope cape or Piao chiao, about 2 miles north-eastward of Tide point, is the north-eastern extremity of a hilly peninsula on the south-western side of the approach to Port Swatow; the highest part of this peninsula, named Lei kou shan or High Cape summit, is conspicuous from the south-westward, its top appearing flat and falling sharply on both sides. The north-eastern side of the peninsula terminates north-westward in a bold point, on which is an old fort.

A light is exhibited, at an elevation of 171 feet (52m1), from a white circular tower, 22 feet (6m7) in height, situated near the extremity of Good Hope cape (*Lat. 23° 14′ N., Long. 116° 48′ E.*). A fog signal is made from the lighthouse.

Ta chiao or Tower point is situated about 3½ miles north-north-westward of Good Hope cape. Hsin chi shan or Signal hill, about 2½ miles north-westward of Ta chiao, is steep on the northern side near the signal station, but continues at about the same level for a considerable distance south-eastward. Chien shih or Peaked rock lies nearly 1¾ miles northward of Ta chiao and barely one cable offshore, on the southern side of the entrance to Port Swatow. The coast between Ta chiao and Chien shih is interspersed with conspicuous sandy beaches and there are several detached rocks some distance offshore; Chuan chiao, the outer rock, is awash, and lies about 6 cables south-eastward of Chien shih.

The coast on the northern side of the entrance to Port Swatow consists of low sandhills fronted by extensive sandbanks which partially dry. Pagoda hill (chart 1957), on the coast about 7½ miles north-eastward of Chien shih, appears as an islet; there is a pagoda on its summit.

Charts 1957, 1962, 1968, 2661b, 1262.

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Chart 854.

Islets and dangers in the approach to Port Swatow.—Ku shih or Williams rocks is a patch of foul ground, with a least depth of 4 fathoms (7m3), lying about 4 cables eastward of Good Hope cape. Lu Yu lighthouse (page 67) in line with the eastern side of Chih wen tao, bearing 327°, leads about 1½ cables north-eastward of these rocks.

Ching tao or Green islet lies about 8 cables north-north-westward of Good Hope cape; rocks extend about 1½ cables north-eastward from the islet, one near the outer end being 2 feet (0m6) high, and a rocky patch, with several heads above water, lies between the islet and the coast south-westward.

Chih wen tao or Bill islet lies about 1¾ miles north-north-westward of Ching tao. Chih shih tzu, about 3 cables southward of Chih wen tao, is a large square rock about 15 feet (4m6) high; a reef, on which the sea constantly breaks, extends about 3 cables south-westward. Ou shih or Phillips rocks, about 3 cables south-eastward of Chih shih tzu, are two patches with depths of 1½ and 2½ fathoms (2m3 and 4m6) over them, respectively. All these dangers are covered by the *red* sector of Good Hope cape light between the bearings of 148° and 170°.

Wu chiao erh or Dove rock lies nearly 3½ miles north-eastward of Chih wen tao and has a least depth of one fathom (1m8) over it. A whistle-buoy, painted in red and black chequers, is moored about 2 cables southward of Wu chiao erh. The point northward of Lei kou shan in line with the south-eastern side of Ching tao, bearing 219°, leads south-eastward of Wu chiao erh; view C on chart 854. The northern extremity of Ma tao (page 67) bearing 289° and just open northward of Lu Yu (page 67), leads southward of the rock; view A on chart 584. The northern summit of Chueh shih (page 68) in line with the southern extremity of Mu Yu (page 67), bearing 274°, leads northward of the rock; view B on chart 854.

Tai hsia chin or Joachim bank extends from the coast northward of the entrance to Port Swatow; the south-eastern part, known as Tai hsia chin or Joachim spit, extends into the fairway of the estuary with depths of 2 fathoms (3m7) and less, and there are heavy rollers on it after strong breezes. In 1936 a wreck, partly above water, lay south-eastward of Tai hsia chin spit and nearly 1½ miles northward of Chih wen tao (*Lat. 23° 17′ N., Long. 116° 47′ E.*).

PORT SWATOW.—Port Swatow, known to the Chinese as Port of Shantou, is situated at the entrance of the Han river, and was opened to foreign trade by the Treaty of Tientsin in 1858; it is the shipping port of Chaochow fu, one of the principal cities of the province of Kwangtung. A branch of the Han river runs from Chaochow fu to Swatow, but it is only navigable by flat-bottomed boats.

The eastern limit of the port is formed by the meridian through the eastern extremity of Lu Yu or Sugarloaf island, and the western limit by the meridian through Ta hao tsui (Ta tau point), nearly 6 miles westward.

Depths.—A depth of 13 feet (4m0) can be carried across the bar in the approach. At high water Swatow can be reached by vessels with a draught of 20½ feet (6m2) at spring tides, and 19 feet (5m8) at neaps, during the north-east monsoon; in the south-west monsoon the permissable draught is about one foot (0m3) less. In 1935 a vessel

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Chart 854.

with a draught of 22½ feet (6m8) entered the port. In 1937 it was reported that the depths on the bar, in a position from three-quarters of a mile to one mile north-north-westward of Chih wen tao, were 2 feet (0m6) less than those shown on the chart.

Islands in the entrance.—Light.—Lu Yu or Sugarloaf island is the outermost of the islands in the entrance to Port Swatow. A rocky patch lies about 2 cables eastward of the south-east point of the island; at the southern end of this patch is a rock one foot (0m3) high, and at the northern end is a rock which dries 8 feet (2m4).

A light is exhibited, at an elevation of 200 feet (61m0), from a red circular tower, 22 feet (6m7) in height, situated on the south-eastern end of the summit of Lu Yu; the keepers' dwellings are white. For leading lights on Lu Yu, *see* page 68.

Mu Yu or Double island, about half a mile north-westward of Lu Yu, appears double when seen from the south-eastward; the southern hill is the higher and has an old fort on it. A hill on the eastern extremity of the island appears square-topped when seen from the south-eastward. The white walls of some houses on the island are noticeable from seaward. Kuai chiao or Guelph rocks, which dry 5 feet (1m5), lie about one cable southward of the south-east point of Mu Yu and dry 5 feet (1m5); the channel between these rocks and Lu Yu should not be used.

Ma tao or Fisherman island lies about half a mile south-westward of Mu Yu and close off the southern shore of the channel; Lu kuei yu or Kinaldi islet lies about one mile south-eastward of Ma tao, on a partially drying bank which fills Ni wan or Muddy bay.

Entrance channels.—Dangers.—Lu Yu or Sugarloaf channel is the south-western of the two channels giving access to Port Swatow; it lies between the south-western sides of Lu Yu and Mu Yu and the coast south-westward, and is about 1½ cables wide in the narrowest part, with depths of from 6 to 11 fathoms (11m0 to 20m1) in the fairway. This channel is more generally used than the Eastern channel, but the tidal streams, especially the flood stream, are strong, and cause eddies off the north-western extremity of Lu Yu, which may render navigation difficult when there is much shipping in the channel; under such circumstances, Eastern channel is preferable. A spit, with a depth of 2 fathoms (3m7), extends nearly 1½ cables westward from the north-west point of Lu Yu; on the opposite side of the channel, and nearly 3 cables westward of the same point, is a rocky patch with a depth of 2¾ fathoms (5m0). Fu yin chiao or Frewin rock, about 3 cables southward of Mu Yu, lies on the southern side of the fairway and has a depth of 1¼ fathoms (2m3) over it. Kuai chiao, on the northern side of the fairway, has been already described.

Eastern channel lies north-eastward of Lu Yu and Mu Yu, and has depths of from 3½ to 8 fathoms (6m4 to 14m6) in the fairway.

A 2¾-fathom (5m0) patch lies nearly 1¼ miles west-north-westward of the north-west point of Mu Yu, and it is probable that the depths in this vicinity are from 3 to 4 feet (0m9 to 1m2) less than charted.

Fishing stakes.—Lights.—Between Mu Yu and the anchorage off Swatow are numerous rows of fishing stakes, some of which are a hindrance to navigation at night. In daylight they form a very good guide for the main channel inside the harbour, as they are placed in deep water on either side. Buoys are frequently placed to mark the

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Chart 854.

fishing nets off the south-west point of Mu Yu; a *white* light is usually exhibited from the outer stakes, but it cannot be relied on. Vessels occasionally come into collision with the fishing stakes, when damages are usually successfully claimed by the fishermen; boats have been frequently swept by the tidal streams against the submerged nets, in several instances with loss of life. The nets are only laid out during the out-going stream.

Two leading lights, nearly 1¼ cables apart, are exhibited on the south-western side of Lu Yu; these lights are in line bearing 127°, and indicate the south-western extremity of the fishing stakes off Mu Yu.

Chueh shih.—Dangers.—Light.—Buoys.—Chueh shih (Kakchio promontory), on the southern side of Port Swatow and about 2¼ miles westward of Ma tao, appears from seaward as one continuous hill, as the numerous ravines on it are only seen when close to; Hsiang lu shan or Mount Beatty (*Lat. 23° 19′ N., Long. 116° 40′ E.*), about 1¼ miles south-westward of Chueh shih tsui (Kakchio point), the north-eastern extremity of the promontory, is conspicuous. The hills eastward of Hsiang lu shan are irregular, rugged, and strewn with boulders, but are cultivated in places. The British Consulate is situated on the northern side of the promontory, and a stone jetty with a wooden extension, which renders it accessible to boats except at very low tides, extends from the shore here; a light is exhibited at the head of the jetty. Other Europeans' houses are also situated on the promontory. The 193-foot (58^{m}8) high hill, nearly 3 cables westward of the British Consulate, and the 233-foot (71^{m}0) high hill about 4 cables eastward of the Consulate, each has a conspicuous boulder on the summit; in 1936 these boulders had white rectangular marks painted on them.

Kung hsieh shih or Bottefurh's rock, 50 feet (91^{m}4) high, lies close off the northern extremity of Chueh shih. Kung hsieh chiao or Wyoming rock, with a depth of 4 feet (1^{m}2) over it, lies about three-quarters of a mile north-north-westward of Kung hsieh shih; a black conical buoy, surmounted by a black inverted frustum cage, is moored off the north-eastern side of Kung hsieh chiao. Szu an chiao or Cheuto rock, about 2 cables westward of Kung hsieh shih, has a depth of 4 feet (1^{m}2) over it.

Hu kou chiao or Madras rock, about half a mile westward of Kung hsieh shih, is a pinnacle with a depth of 6 feet (1^{m}8); a black conical buoy, surmounted by a black spherical cage, is moored off its north-eastern side.

Niu mu chiao (Gochang rock) lies about 2 cables northward of Niu tien chow (Gochang point), the north-western extremity of Chueh shih, and is covered at high water; a black stone beacon, 5 feet (1^{m}5) in height, surmounted by a sphere, stands on this rock.

Tidal streams.—The tides are irregular and are considerably influenced by the prevailing winds, thus: with easterly winds of more than force 3 high tide may be expected later and higher, and low tide sooner and higher; with westerly winds of more than force 3 high tide may be expected sooner and lower, and low tide later and lower. It is stated that during the south-west monsoon the rise may be only 2 or 3 feet (0^{m}6 or 0^{m}9) for a number of days. The water falls to the level of low water ordinary spring tides only after a calm of one or two days' duration, and quite irrespectively of the moon's age; conse-

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Chart 854.

quently there is generally more water on the flat between Chih wen tao and Tai hsia chin spit than is shown on the chart.

In Lu Yu channel, Eastern channel, and the channel between Lu Yu and Mu Yu, the in-going stream runs from one to 2 hours after low water until one to 2 hours after high water, and the out-going stream from one to 2 hours after high water until one to 2 hours after low water. Eddies form westward of Lu Yu, particularly with the in-going stream. The tidal streams set directly through Lu Yu channel, except north-westward of Lu Yu island, where a branch of the out-going stream runs along the northern side of that island.

At the anchorage off Swatow the in-going stream runs from 1½ hours after low water until three-quarters of an hour after high water, and the out-going stream from three-quarters of an hour after high water until 1½ hours after low water. The stream on the southern side of the anchorage turns earlier than that on the northern side.

The in-going stream attains a maximum rate of 2 knots, and the out-going 4 knots.

Pilots.—The pilot station is situated on Mu Yu. The pilot boats are painted white, with black topsides and a white band; they have the words "Licensed Pilot-boat" painted on the stern and on the mainsail, and they fly a yellow and green flag. The pilotage ground is off Chih wen tao. Vessels requiring a pilot should give previous notice of the date of their arrival.

Harbour regulations.—Anchorages.—The anchorages for foreign vessels are:—

(*a*) For vessels other than those provided for in (*b*), (*c*), and (*d*):—
That part of the harbour which is included between lines drawn north from Old Fort and Ta hao tsui.

(*b*) For vessels carrying mineral oil, etc.:—
Immediately eastward of anchorage (*a*), and within the limits of anchorage (*a*), westward of Niu mu chiao.

(*c*) For vessels carrying explosives:—
Not less than 4 cables eastward of anchorage (*a*).

(*d*) For vessels in quarantine:—
On the northern side of the harbour between the Standard Oil Company's installation and the Round Fort.

Vessels entering the harbour will be boarded by a berthing officer who will direct them to proper berths.

There are special instructions in these regulations for vessels arriving with munitions, mineral oil, &c., and infectious diseases on board.

Vessels when in the harbour and its approaches are forbidden to proceed at such a speed as renders their wash dangerous to other craft.

Vessels shall moor in accordance with instructions received from the Harbour master, and shall not shift their berths without a special permit.

Applications for berths or for permission to shift must be made at the Harbour master's office by the agents, the shipmaster, or the pilot in charge.

Only men-of-war may use swinging booms.

H.M. ships usually anchor in a position about 3¾ cables northward of the British Consulate; the holding ground is reported to be bad. In 1936 H.M.S. *Sandwich* moored with the British Consulate flagstaff bearing 168°, distant 3¼ cables, and found good holding ground.

Charts 1962, 1968, 2661b, 1262.

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Chart 854.

In 1926 H.M.S. *Foxglove* found good holding ground about 4½ cables north-eastward of Kuei yu or West island.

Mooring buoys.—Berthing signals.—There are two lines of mooring buoys off Swatow; the buoys are numbered from 1 to 15, the odd-numbered buoys being on the inner or Swatow side, and the even-numbered buoys on the Chueh shih side. There are no buoys numbered 2, 12, and 14. The berths to be taken by vessels arriving are signalled from the Customs house flagstaff; a vessel's House flag or National flag and number over a black ball, with a numeral flag below, indicates the particular buoy to be taken.

The International code flag "B" indicates "anchor as convenient." Masters of vessels are, however, requested not to anchor eastward of the line joining Niu mu chiao beacon and a red conical buoy about half a mile northward, as this berth is used solely as a swinging berth.

The International code flag "Q" hoisted below a vessels' House flag or National flag and number indicates that the vessel is in quarantine and is to proceed direct to the quarantine anchorage and await medical inspection.

Wharves.—Lights.—There are no actual wharves in the port, only pontoons with bridge connections to the shore; these pontoons are the property of the various shipping companies, and there are sufficient depths alongside them for the ordinary coasting steamers, though these vessels sometimes take the ground at low water.

A light is exhibited on the south-west corner of the boat harbour near the Custom house, situated on the northern side of the port. A light is exhibited on the Asiatic Petroleum Company's pier head, situated about 7 cables eastward of the Custom House, and another light is exhibited on the Standard Vacuum Oil Company's pier head, situated about 2 cables further eastward.

Directions.—Vessels should not attempt to enter Port Swatow during the out-going stream unless it is a flat calm or they are certain of having depths of from 5 to 6 feet (1^m5 or 1^m6) under them, on account of the heavy sea then on the bar. A good way to estimate the depth on the bar is to sound 2 cables north-eastward of Chih wen tao, and this sounding, reduced by 7 feet (2^m1), gives approximately the least depth on the bar at the time. When approaching Port Swatow from the northward, vessels may pass either eastward or westward of Wu chiao erh (for clearing marks, *see* page 66), according to draught, and then proceed to a position about 4 cables north-eastward of Chih wen tao. From the southward, vessels must pass eastward of the islets and dangers off-lying the coast between Good Hope cape and Chih wen tao (*Lat. 23° 17′ N., Long. 116° 47′ E.*).

For Lu Yu channel, the following route was followed by the pilots in 1927:—After passing Chih wen tao a vessel should steer for Lu Yu lighthouse bearing 319°; when Hsin chi shan is in line with Chien shih, bearing 285°, alter course to 310°, through Lu Yu channel, taking care to keep Chien shih well open of the land north-westward of it in order to clear Fu yin chiao and the 2¾-fathom (5^m0) patch south-eastward; for leading lights for clearing the fishing stakes off Mu Yu, *see* page 68. Continue on this course until Hsin chi shan is in line with the summit of Ma tao, bearing 162°, when alter course to 280°, keeping the northern extremity of Mu Yu bearing 100° astern,

Charts 1962, 1968, 2661b, 1262.

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Chart 854.

which leads up the harbour. When outward bound, it is useful to know that when Kuai chiao is covered a depth of not less than 19 feet (5m8) will be found on the bar.

For Eastern channel, the following route was followed by the pilots in 1926:—From a position eastward of Chih wen tao steer for Lu Yu lighthouse bearing 320°. When Chien shih bears 270° alter course to 349°, and when Hsin chi shan is in line with the north-western extremity of Lu Yu, bearing 231°, alter course to 295° to pass close northward of the fishing stakes extending from Mu Yu. When Hsin chi shan is in line with the north-western extremity of Mu Yu, bearing 191°, alter course to 279°, and then as requisite for the anchorage.

Storm warnings.—Typhoon anchorages.—Typhoon and storm warnings are received from the Royal Observatory, Hong Kong; all weather telegrams received are signalled and are shown on the notice board outside the Harbour master's office. One black ball by day, or one *red* light at night, shown at the Custom house storm signal station, indicates the approach of a gale; two black balls by day, disposed vertically, or two *red* lights at night, disposed horizontally, indicate a storm or typhoon.

On the approach of a typhoon vessels usually leave the anchorage off Swatow and anchor about midway between the fort on the northern shore, about 1½ miles eastward of the Customs house, and Mu Yu, where the holding ground is better and the typhoon can be ridden out in safety. Vessels of moderate draught can proceed up the river and anchor about 4 cables north-westward of Kuei yu or West island, where there will probably be less sea.

Town of Swatow.—Swatow (*Lat. 23° 21′ N., Long. 116° 40′ E.*), known to the Chinese as Shantou, contains several handsome buildings, Eastward of the town are many fine houses; the Anglo-Chinese college, about 1¼ miles east-north-eastward of the Custom house, is a building with a tower. A conspicuous white water tower stands about 4 cables northward of the Custom house, and two wireless masts, about 2½ cables north-eastward of the Custom house, are also conspicuous.

A large expanse of mud on both banks of the river dries, or is only just covered, at low tide, and a tract of land for about 1½ miles eastward of the Custom house has been reclaimed.

The population of Swatow in 1935 was 178,636.

Harbour facilities.—A small supply of coal is available; there is a depth of 15 feet (4m6) alongside the coaling wharf. Fuel oil is obtainable. Fresh provisions are plentiful; water is supplied to vessels in the stream by water boat.

There are several hospitals at Swatow.

Small repairs to vessels can be executed.

Swatow is connected to Chaochow fu by rail. There is frequent steamship communication with Hong Kong and the principal China ports. Swatow is connected to the general telegraph system.

Shipping.—In 1935, 2,270 steam vessels, with an aggregate of 3,399,313 tons, entered the Port of Swatow.

Chart 1957.

ISLANDS EASTWARD OF PORT SWATOW.—Lamock islands.—The Lamock islands consist of four islets and a number of rocks above water and sunken rocks.

Charts 1962, 1760, 1968, 2661b, 1262.

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Chart 1957.

Boat rocks, at the south-western end of the group, and about 24 miles eastward of Good Hope cape, consist of two square rocks about 15 feet (4m6) high, with other rocks near them; the western side of East Lamock in line with the eastern side of High Lamock, bearing 032°, leads about three-quarters of a mile south-eastward of Boat rocks. White rock, about one mile north-eastward of the western Boat rock, is surrounded by rocks, and is sufficiently large to afford shelter to a boat. All these rocks are covered by the sector of *red* light shown from the lighthouse on the south-western end of High Lamock.

High Lamock, nearly 3 miles north-eastward of White rock, is partly covered with grass and other vegetation; the channel between this islet and White rock is clear. *See* view facing page 63.

East Lamock lies about one mile north-eastward of High Lamock, and rocks extend for about three-quarters of a mile from its south-western side. North rocks lie close north-eastward of East Lamock, and the northern has a pyramid on it.

Times rock (*Lat. 23° 18′ N., Long. 117° 20′ E.*), nearly 2 miles north-eastward of East Lamock, is a pinnacle with a depth of 1½ fathoms (2m7). High Lamock open north-westward of East Lamock leads westward of Times rock, and open south-eastward leads south-eastward of the rock.

During the south-west monsoon the tidal streams in the vicinity of the Lamock islands run north-eastward, attaining a maximum rate of 1½ knots, and south-south-westward, with a maximum rate of one knot.

Lights.—Fog signal.—A light is exhibited, at an elevation of 242 feet (73m8), from a black circular tower, 58 feet (17m7) in height, situated on the summit of High Lamock island. The keepers' dwellings and boundary wall are white. A fog signal is sounded from this lighthouse.

A light is exhibited, at an elevation of 55 feet (16m8), from a window in a white building nearly 2 cables south-westward of the main lighthouse.

Dangers north-westward of the Lamock islands.—The depths between the Lamock islands and Three Chimney bluff, the south-eastern extremity of Namoa island, about 12 miles north-westward, are very uneven; the shoal patches are frequently marked by ripplings.

In 1906, a 6-fathom (11m0) patch was reported about 3½ miles westward of White rock; in 1907, a 7-fathom (12m8) patch was reported about 2½ miles west-north-westward of High Lamock, and a 9-fathom (16m5) patch about 1¾ miles north-westward of East Lamock.

Sinta rock, a pinnacle with a depth of 2 feet (0m6), lies about 5 miles north-westward of White rock. A 6-fathom (11m0) patch lies about three-quarters of a mile south-eastward of Sinta rock, and about half a mile farther south-eastward is a 5-fathom (9m1) patch. A shoal, with a least depth of 5 fathoms (9m1), lies nearly 3 miles eastward of Sinta rock.

Yeng rock, awash, lies nearly 5 miles northward of Sinta rock. North point of Namoa island, bearing about 325° and open north-eastward of East point, leads north-eastward of this rock.

Lamon islands.—The Lamon islands, lying north-westward of the Lamock islands and southward of the eastern end of Namoa island, consist of four islets and a number of rocks above water and sunken rocks.

Charts 1962, 1760, 1968, 2661b, 1262.

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Chart 1957.

Ruff islet, the south-eastern islet of the group, lies about 8¾ miles north-westward of White rock; a 3½-fathom (5m9) patch lies 2 cables north-north-westward, and a 5-fathom (9m1) patch 7 cables north-north-eastward of the islet. Dot rock lies about 4 cables southward of Ruff islet and dries about 10 feet (3m0). Sul rocks, about 4 cables southward of Dot rock, dry from 4 to 7 feet (1m2 to 2m1), with a rock one foot (0m3) high in the northern part. Norway rock, about 1¾ miles south-south-eastward of Ruff islet, is a pinnacle with a depth of 2 fathoms (3m7); in calm weather, during the strength of the tidal stream, it is marked by ripples.

Oeste islet, about 1½ miles westward of Ruff islet, lies on the north-eastern end of a shoal with depths of less than 5 fathoms (9m1); a detached patch, with a depth of 4½ fathoms (7m8), lies about a quarter of a mile north-westward of Oeste islet.

Plat islet, about one mile north-westward of Oeste islet, has a flat top; a drying rock lies off its south-east point, and a shoal, with depths of less than 6 fathoms (11m0), extends about 1½ miles west-south-westward from the islet. Mackinnon rock, about 7 cables north-eastward of Plat islet, is a pinnacle with a depth of 5 feet (1m5); a 5¾-fathom (10m5) patch lies about 6 cables north-north-eastward of the islet, and a 5½-fathom (10m1) patch lies nearly 1½ miles north-westward of the islet.

Dome islet lies about 3 miles north-eastward of Plat islet, and is the northernmost of the group. A rock, with a depth of 2¾ fathoms (5m0), lies about 3 cables westward of Dome islet, and a shoal, with a least depth of 4½ fathoms (7m8), lies about 4 cables south-eastward of the islet.

Half-tide reef, nearly one mile northward of Dome islet, dries from 5 to 7 feet (1m5 to 2m1).

Namoa island.—Namoa island lies with Clipper point, its south-western extremity, about 13½ miles north-eastward of Good Hope cape. West peak, about 1½ miles eastward of Clipper point, Namoa peak, in about the middle of the eastern half of the island, and Saddle peak, about 1¾ miles north-westward of Namoa peak, are prominent features.

Although the island is barren, it is well populated, the fisheries affording a livelihood to the greater portion of the inhabitants. There are four villages on the island: Yangkang, situated on its narrowest part, Wanao, in the south-eastern part, and Chengao and Nanao, the latter being walled, in the north-eastern part.

South coast of Namoa.—Off-lying dangers.—Three Chimney bluff (*Lat. 23° 24′ N., Long. 117° 07′ E.*), the south-east point of Namoa, is a bold headland rising to an elevation of 380 feet (115m8). Crab islet, with a flat top, lies off the entrance to a shoal bay between Three Chimney bluff and South point, about 1½ miles westward.

South bay lies between South point and a point about 2½ miles westward, and affords good shelter in the north-east monsoon. Tamsui rock, with a depth of 3 fathoms (5m5), lies about 2½ miles south-westward of South point; fishing stakes may be found extending from the shore of South bay to this rock. Three Chimney bluff bearing 065°, and open south-eastward of Crab islet, leads south-eastward of Tamsui rock. Kaipan rock, with a depth of 2½ fathoms (4m6), lies about 2½ miles west-south-westward of South point.

Charts 1962, 1968, 2661b, 1262.

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Chart 1957.

Nearly 4 miles westward of South point is a point with a pagoda on it, and close westward of the latter point is a small bay.

A series of shifting sand knolls, with depths of from 2 to 3 fathoms (3m7 to 5m5) over them, lie within a distance of 5 miles south-westward of Clipper point.

Off the south coast of Namoa the east-north-east-going tidal stream attains a rate of about 2 knots off Three Chimney bluff, when it changes its direction to north-eastward; there are usually heavy tide-rips, especially during the north-east monsoon, southward of the bluff, where the depths are very uneven.

Clipper road.—Island and rocks.—Clipper road lies between the north-west coast of Namoa and Brig island, situated about 2¼ miles north-westward of Clipper point, and affords anchorage in the south-west monsoon in depths of from 5 to 6 fathoms (9m1 to 11m0), good holding ground.

Breaker islet is a peaked rock about 4 miles north-eastward of Brig island, and there are other rocks close westward and northward of it. Folkestone rock, with a depth of 5 feet (1m5), lies about midway between Brig island and Breaker islet; the northern end of Fort island (page 75) bearing about 247°, and open south-eastward of the south point of Brig island, leads south-eastward of this rock.

A 2¾-fathom (5m0) patch lies about 2¾ miles eastward of Breaker islet and on the northern side of the approach to Clipper road from the north-eastward. Vessels approaching from this direction must exercise caution, as large fishing stakes may be found in the channel northward of Namoa island.

North coast of Namoa.—Opium point is situated about 3 miles north-eastward of Clipper point, and Shoal bay, with general depths of less than 2 fathoms (3m7), lies between Opium point and a point about 4 miles eastward. Bay islet lies nearly 1½ miles eastward of Opium point; Batao rock, 50 feet (15m2) high, lies close northward of Bay islet; westward and southward of the latter are some rocks above water. Yangkang village is situated on the low land at the head of the bay, where the island is only about half a mile across.

Nangaou bay lies eastward of Saddle peak, and at the head is the walled village of Nanao. Pagoda islet and Battery island lie on the eastern side of the bay. Nangaou bay is shoal, and vessels not exceeding 18 feet (5m5) draught cannot anchor farther southward than Pagoda islet bearing 079°; during the north-east monsoon there is a considerable swell, and the entrance to Challum bay (page 75) is then a better anchorage.

North point, the northern extremity of Namoa, rises to a double peak 575 feet (175m3) high; rocks extend 3 cables north-eastward from the point.

The tidal streams northward of Namoa run parallel to the coast; the east-going stream runs from three to five hours after high water until three to one hour before the next high water, and the west-going stream from three to one hour before until three to five hours after high water. The rate is from one to 3 knots, but is less off Nangaou bay.

East coast of Namoa.—Outlying dangers.—Some rocks above water and rocks which dry lie close off the coast for about one mile southward of North point. East point (*Lat. 23° 27′ N., Long. 117°*

Charts 1962, 1968, 2661b, 1262.

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Chart 1957.

09′ E.), about 2¾ miles south-south-eastward of North point, is bare and cliffy, and rises to a summit 185 feet (56m4) high; Hart rock, with a depth of 6 fathoms (11m0), lies 6 cables eastward of this point. Obelisk islet lies close off the coast about 1½ miles southward of East point. Glengyle rock, with a depth of 2½ fathoms (4m6), lies about three-quarters of a mile southward of Obelisk islet and 4 cables offshore, and breaks at low water; Dome islet, bearing 208°, seen midway between Oeste and Ruff islets, leads eastward of Glengyle rock.

Gibson rock lies about 8½ miles eastward of East point, and has a depth of 3¼ fathoms (5m9) over it. A 6-fathom (11m0) patch lies 2½ miles east-south-eastward and 4 miles eastward, respectively, of East point.

Chelsiu rocks, about 5 miles north-eastward of East point, consist of six rocks about 6 feet (1m8) high; when seen from eastward or westward these rocks appear as large boulders some distance apart.

Dioyu reef, about 5 miles north-eastward of North point, dries about 10 feet (3m0); Saddle peak in line with the southern extremity of Pagoda islet, bearing 240°, leads north-westward of Dioyu reef. Vessels using the channel northward of Namoa island usually pass northward of this reef.

COAST.—About 10 miles northward of Good Hope cape is a small promontory with a pagoda on it, elevated 257 feet (78m3). The coast for about 15 miles northward of this promontory is low and is intersected by the numerous branches of the Han river. Fort island lies about 1½ miles north-eastward of the pagoda and is divided into two parts by a low neck; there is a fort on the south-western part of the island. Brig island lies about 3¾ miles north-eastward of Fort island, and there are shoal depths between it and the coast. Coffin islets lie between 2½ and 3½ miles northward of Brig island.

Chart 3715, plan of Challum bay anchorage.

Challum bay.—The western side of Challum bay is formed by Prong island (chart 1957), the southern extremity of which lies about 4½ miles north-eastward of Brig island, and other islands between it and the coast northward. Challum town is situated on the eastern side of the bay.

A bank, with depths of less than 3 fathoms (5m5), extends as much as 2½ miles eastward from Prong island. Middle islet, a barren rock on the eastern edge of this bank, lies about 2½ miles east-south-eastward of Ford point, which is situated at the north-eastern extremity of Prong island. Entrance island, separated from the north-eastern extremity of Prong island by a narrow channel, with a rock, which dries 3 feet (0m9), in the middle, is mostly rocky and barren; there is a village on its south-western side.

Fort head, on the eastern side of the entrance to Challum bay and about one mile eastward of Middle islet, is the southern extremity of a high peninsula connected to the coast by a low, sandy isthmus; on the inner end of this isthmus is Fort hill, a conspicuous hill at the southern end of Philips range, which runs along the eastern side of the bay. A large patch of sand on the north-western slope of the peninsula is conspicuous from the south-westward. East shoal, 6 cables westward of Fort head, has a depth of 3 fathoms (3m7) over it. A group of rocks, some of which are 10 feet (3m0) high and others

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Chart 3715, plan of Challum bay anchorage.

of which dry, lies close off the coast nearly half a mile eastward of Fort head, and about 1¼ miles north-eastward of this head is an isolated rock, 9 feet (2m7) high, situated near the edge of the coastal bank.

Challum island is separated from the peninsula just described by Junk passage, a narrow channel which almost dries at its northern end; two rocks, which dry 2 feet (0m6) and 6 feet (1m8), respectively, lie in the northern entrance of this passage. The island has several rocky summits, the highest being at the north-western end; there are numerous patches of cultivation, and, in addition to a few scattered houses, there is a village in the south-eastern part of the island. Several small islets lie off the eastern and north-eastern sides of Challum island, and pagodas stand on two of them.

Back bay island, nearly 2 miles northward of Entrance island, is well cultivated, and there is a large village on its northern side. White rock lies on the mud flat extending from the southern side of the island.

The greater part of Challum bay is shoal, but good anchorage can be obtained, in depths of from 5 to 6 fathoms (9m1 to 11m0), mud, between Entrance and Challum islands, though it is somewhat obstructed by fishing stakes; this anchorage is sheltered from winds between north-east and south-east, and there is a least depth of 3¾ fathoms (6m9) in the fairway of the approach. At the anchorage the in-going stream sets north-north-westward, and continues until about an hour after high water; the out-going stream sets southward, and continues until about an hour after low water. The maximum rate of both streams is about 2½ knots at spring tides.

Directions.—Challum bay should be approached with the north-eastern extremity of Entrance island bearing 326°, which leads about 1½ cables eastward of Middle islet and between the banks extending from either side of the entrance; when about a mile within Middle islet, course should be altered to about 340°, and a vessel can anchor in mid-channel, with Newrick point (*Lat. 23° 35′ N., Long. 117° 03′ E.*), the north-western extremity of Challum island, bearing about 064°.

On a clear night, the previously mentioned sand patch on the peninsula on the eastern side of the entrance is a good mark when approaching from the south-westward.

Chart 1957.

Coast.—Danger.—Difficult point, about 2¾ miles north-eastward of Fort head, has an islet close off it; Difficult islet lies close offshore about half a mile north-eastward of the point. Ternate rock, with a depth of one foot (0m3), lies about 1¾ miles eastward of Difficult point and one mile offshore.

About 6½ miles north-eastward of Difficult point is the entrance to Shoal bay. The eastern side of the entrance is formed by a rocky peninsula, attaining an elevation of 374 feet (114m0) on its south-eastern side; its north-eastern side is low and cultivated. Barren head is the south-east point of this peninsula. A conspicuous pagoda, with the top elevated 302 feet (92m0), stands on a hill about 2½ miles northward of Barren head.

Chart 3715, plan of Chauan bay.

Chauan bay.—Chauan bay, entered between Barren head and

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Chart 3715, plan of Chauan bay.

Chauan head, about 4½ miles east-south-eastward, affords good shelter during the south-west monsoon, but in the north-east monsoon a short, steep sea arises in the bay when the wind is strong, and renders the anchorage uncomfortable; the bottom is soft mud and bad holding ground. On the approach of a typhoon a vessel at anchor in the bay should proceed to Clipper road (page 74) or Tongsang harbour (page 79).

Shoal water, marked by discoloration, extends about a mile from the western side of the entrance, and a detached shoal, with a least depth of 2½ fathoms (4m6), lies about 1¼ miles south-south-eastward of Barren head, thus forming a bar across the entrance channel to the bay; with a moderate swell the sea breaks on this bar from about 2 hours before to 2 hours after low water. Some drying rocks lie close off Brown point, situated about 2¾ miles north-eastward of Barren head.

Kwadra island lies about 2¼ miles eastward of Barren head and in the middle of the entrance to the bay; the deepest channel is along its western side. Some drying rocks lie within a quarter of a mile westward of the island, and within about 3 cables south-westward of its southern extremity. A bank, with depths of less than 3 fathoms (5m5), extends about three-quarters of a mile southward of the island, and just within its outer edge is a patch with a depth of 4 feet (1m2). Mitre rock lies nearly 4 cables eastward of Kwadra island and midway between this island and High island.

High island has several summits, the highest being at the south-western end.

Anchorage.—Directions.—There is anchorage, in a depth of 6 fathoms (11m0), with the north point of Kwadra island bearing 103°, distant about half a mile; vessels can also anchor farther inside the bay, in a depth of 2¾ fathoms (5m0), with the western side of Chauan head in line with the south-western extremity of High island, bearing about 168°.

A vessel entering the bay, from a position about 2 miles south-westward of Kwadra island, should bring the 152-foot (46m3) high summit on Brown point in line with a dip in the hills behind, bearing 019°; this mark leads across the bar in a depth of about 2¾ fathoms (5m0). When the southern extremities of High island and Kwadra island are in line, bearing 070°, she should steer 038° for the anchorage. Fishing stakes are frequently to be found between Kwadra island and Brown point.

The tidal streams turn at high and low water, and attain a maximum rate of 1¾ knots at spring tides; there is a considerable diurnal inequality.

Coast.—Off-lying islets.—Owick bay lies between Ping tau, a rocky point about one mile east-north-eastward of Chauan head, and Owick point, the extremity of a peninsula about 1¾ miles east-south-eastward; Owick hill rises just within Owick point. A rock, 9 feet (2m7) high, lies 1½ cables southward of Owick point, and a rock below water lies close off the western side of this rock. Anchorage can be obtained, in a depth of 3½ fathoms (6m4), mud, with the 9-foot (2m7) high rock bearing 135°; this anchorage is sheltered from northern winds, but should not be used during the typhoon months, as it is unsafe with south-westerly winds. The bay should not be approached

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Chart 3715 plan of Chauan bay.

to a depth of less than 5 fathoms (9m1) after dark, as the distance from the land is very deceptive; there is a conspicuous sand patch on the side of the hills about 1½ miles north-eastward of Owick point. Fishing stakes may be found from 2 to 5 miles southward of Owick bay.

Bell islet (*Lat. 23° 34′ N., Long. 117° 25′ E.*) lies nearly 2¾ miles eastward of Owick point, and is perforated on its north-western and south-eastern sides; Little Bell islet lies about 2 cables northward of Bell islet. A reef, with depths of less than 3 fathoms (5m5) on its outer edge, extends about 7 cables north-westward from Bell islet; the channel between this reef and the coast northward should be used with caution, as the tidal streams are strong. There is fairly good anchorage, sheltered from easterly and northerly winds, but open to the swell, about half a mile westward of Bell islet, in depths of from 7 to 9 fathoms (12m8 to 16m5), mud; in May, 1935, it was reported that this anchorage was entirely occupied by fishing stakes. *Chart 1957.*

Jokako point, about 4 miles eastward of Owick point, rises to an isolated hill 640 feet (195m1) high; there is a large village at the foot of the western slope of this hill. Jokako peak, about 2¼ miles north-westward of the point, is a conical hill, conspicuous from the southward, with a sand patch on its southern slope.

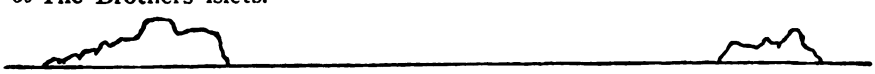
Cliff islet lies about three-quarters of a mile south-eastward of Jokako point, with a clear channel between; a drying reef lies about one cable northward of the north-west point of the islet, and there are some patches, with depths of 5 and 6 fathoms (9m1 and 11m0), around. Square islet lies about 1½ miles north-eastward of Cliff islet, and is perforated at its north-western end. Miranda bank lies nearly 2 miles south-eastward of Cliff islet and has a least depth of 8 fathoms (14m6); the depths in this locality are very irregular.

The tidal streams off Jokako point are strong, and set north-eastward and south-westward; there are tide-rips in the vicinity of Cliff and Square islets. In the offing the tidal streams set north-eastward from about five hours after high water to one hour before the next high water, and south-south-westward from one hour before until five hours after high water, both streams attaining a rate of from one to 2 knots.

Jokako bay lies between Jokako point and Cone point, about 5 miles north-eastward, and is separated from the north-eastern part of Chauan bay by a low, sandy isthmus about one mile wide in its narrowest part. Cone point rises a short distance within to Cone peak. A peaked rock, 30 feet (9m1) high, with a rock a quarter of a mile north-eastward of it, lies off Cone point.

Outlying islets.—The north-western of The Brothers islets lies about 11½ miles south-eastward of Cone point and has a remarkable square summit. The south-eastern islet has a bluff at its southern end, and a reef extends about a quarter of a mile westward.

In 1926, fishing stakes were reported about 5 miles northward of The Brothers islets.



S.E. islet bearing 176°, 10¼ miles

The Brothers islets.
(Original dated 1935)

Charts 1760, 1962, 1968, 2661b, 1262.

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Chart 1958.

Tongsang harbour.—About 3¾ miles north-eastward of Cone point is a point with an islet close off it, and the entrance to Tongsang harbour lies between this point and Kau li tau shan or Thunder head, nearly 3¾ miles eastward. Kau li tau shan is the southern extremity of a peninsula, 474 feet (144m8) high; it is steep-to except on its eastern side, where some rocks lie about a cable offshore. Fall peak, about 3¾ miles northward of Kau li tau shan, is very sharp, and is separated from a 792-ton (241m4) high hill close south-eastward by a deep indentation.

Tongyung, a walled town, is situated on a peninsula on the western side of the entrance; about three-quarters of a mile southward of this peninsula is a headland with three pagodas on it, which is conspicuous from seaward. Pagoda island, divided into two parts by a sand spit about 20 feet (6m1) high, is separated from Tongyung peninsula by a channel about 3 cables wide, with a least depth of 7 fathoms (12m8) in the fairway; a pagoda, with the top elevated 294 feet (89m6), stands on the western end of the southern part of the island. Rocks and shoal water extend 3 cables from the eastern end of the northern part of Pagoda island. There are strong tide rips in the passage between Tongyung and Pagoda island, and it is not even used by junks.

Mid islands, three in number, are situated about three-quarters of a mile north-eastward of Pagoda island; rocks extend 1¼ cables southward of the south point of the southernmost Mid island, and a mudbank extends half a mile northward from the middle island of the three islands. The Sisters lie about 1¼ miles north-north-eastward of the northernmost Mid island.

The eastern shore of the harbour is steep-to for a mile northward of Kau li tau shan, thence it is fronted by a broad bank with depths of less than 3 fathoms (5m5). The harbour extends northward between this bank and Mid islets, and for a distance of about 2¼ miles northward of Kau li tau shan has depths of from 7 to 15 fathoms (12m8 to 27m4) over a width of about 6 cables; there are about the same depths in the channel between Pagoda island and Mid islands. Northward of the later the harbour widens out to an extensive, though shoal basin, which has been only partially examined; a boat channel leads from its western side to Chauan bay. At the northern end of the basin is Greene range, which has a rugged appearance and terminates north-eastward in Thumb peak (chart 1760).

Off-lying dangers.—Yunnan rock, nearly 2¾ miles south-westward of Kau li tau shan, is a pinnacle with a depth of 2 fathoms (3m7).

A mud bank, with a least depth of 3¾ fathoms (6m9), lies about midway between Yunnan rock and Kau li tau shan.

Anchorages.—Directions.—Tongsang harbour is one of the best on this part of the coast, and affords anchorage during a typhoon. Good anchorage may be obtained with Fall peak bearing 060°, and the highest part of the Sisters bearing 358°; in this position H.M.S. *Britomart* rode out a typhoon, in 1913, which passed between Tongsang harbour and Amoy. In 1924, H.M.S. *Bluebell* found lines of fishing stakes, usually not visible above water, running across the above anchorage in an east and west direction and extending as far as 8 cables southward of it; this vessel had a draught of 13 feet (4m0), and found a good berth northward of the fishing stakes, with the summit of

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Chart 1958.

the Sisters bearing 003°, distant 11¼ cables. There is also anchorage in the channel between Pagoda island and Mid islands, but the latter islands must be given a berth of 2 cables, as a mud bank extends from them; the best berth is in a depth of 12 fathoms (21m9), with the Sisters showing through the opening between the two northern Mid islands. In 1935 H.M.S. *Sandwich* anchored in this channel with the pagoda on Pagoda island bearing 235°, distant 9½ cables; the depth in this position was 16 fathoms (29m3), being considerably more than the chart shows. The tidal streams are strong.

The Sisters, bearing less than 005° and well open eastward of Mid islands, leads eastward of the mud bank off the entrance to Tongsang harbour. In clear weather, Thumb peak (chart 1760) in line with the highest part of the Sisters, bearing 358°, is a good mark for entering the harbour.

Chart 1958, plan of Rees pass.

Coast.—Islands and dangers.—Rees rock, about 4 miles north-eastward of Kau li tau shan and one mile offshore, dries 12 feet (3m7); East rock, about one cable eastward of it, is awash. Pass islets, about 1¼ miles northward of Rees rock, are two peaked islets close together and about 90 feet (27m4) high, with a rock above water close off the northern islet; there is shoal water and foul ground between them and Rees rock. Junks use a channel about 2 cables wide, with a least depth of 6 fathoms (11m0), between Pass islets and the mainland, but great caution is necessary in steering owing to the strong eddies. About half a mile northward of Pass islets there is a small peninsula, consisting of a rocky eminence, about 70 feet (21m3) high, connected to the coast by a sandy isthmus.

Rees pass, bounded westward by Pass islets and the peninsula just described, and eastward by the Rees islands, is about three-quarters of a mile wide between the shoals on either side and has depths of over 10 fathoms (18m3) in the fairway. A shoal, with a least depth of 2¼ fathoms (4m1), lies on the eastern side of the pass and about 3 cables westward of Chimney island, the north-western of the Rees islands. Anchorage can be obtained, in a depth of 6 fathoms (11m0), about three-quarters of a mile westward of the south point of Chimney island and about 2 cables north-westward of a black, rocky islet.

Chart 1958.

Off-lying islands and dangers.—Rees islands comprise Chimney island, Flat island, High island, and South-east island, with a number of small islets and rocks; they are all barren and are only visited by fishermen. Simplicia rocks, about 6 cables north-eastward of South-east island, consist of several islets and rocks; a rock below water lies about one cable north-eastward of the eastern rock. Caution must be exercised in the vicinity of the Rees islands; the few soundings shown on the chart indicate a very uneven bottom, and this is confirmed by the manner in which the sea rises quickly and overtops immediately a breeze sets in.

Dansborg island (*Lat. 23° 49′ N., Long. 117° 45′ E.*), about 2 miles north-eastward of Simplicia rocks, rises in three peaks, each about 156 feet (47m5) high, the top of the island appearing long and flat. There is shoal water off the north-western side of the island; landing can be effected on the south-eastern side, but it is difficult.

Skead islet lies about 1¼ miles west-north-westward of Dansborg

Charts 1760, 1962, 1968, 2661b, 1262.

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Chart 1958.

island, and a reef lies close off the east point of the islet. A rock, 30 feet (9m1) high, with a reef off its western side, lies about 4 cables south-eastward of Skead islet.

Gu rock, which dries 3 feet (0m9), lies about 2 miles west-north-westward of Skead islet. In 1935, the *Shuki Maru* struck a submerged obstruction, probably a rock, in a position about one mile east-south-eastward of Gu rock.

Flying Fish rock, which dries 3 feet (0m9), lies about 9 cables north-eastward of Gu rock.

Ching rock, about 1¼ miles northward of Skead islet, is the highest part of a reef and dries 6 feet (1m8); the eastern part of the reef only breaks at low water. The easternmost of the Simplicia rocks open eastward of Skead islet, bearing 178°, leads about 3 cables eastward of the reef.

Tidal streams.—In October, the tidal streams set between south and south-west, with a maximum rate of 1¼ knots, and between north-east and east-north-east, with a maximum rate of one knot.

In a position about 1¼ miles south-eastward of South-east island the tidal streams set between south and south-west, and between north-north-west and north-west; the maximum rate of both streams is 1¼ knots.

Hutau bay.—Hutau bay lies between the small peninsula on the western side of Rees pass and Hutau shan, about 8¾ miles north-eastward. Hutau shan, or Black head, is formed by the southern and most remarkable of five hills situated on the southern half of a peninsula; these hills are smooth and round, with sandy valleys between, and on Town hill, about 1¼ miles northward of Black head, there is a walled town and several trees.

Hutau shan river flows into Hutau bay immediately westward of the above peninsula; there is deep water inside its entrance, but it is not navigable unless previously buoyed, as the shifting channels are narrow and intricate. A partly drying spit extends about 3¼ miles south-westward from the western side of the peninsula.

Chart 811, plan of anchorages between Black head and Crab point.

Coast.—Off-lying islets and dangers.—Tagau point is situated about 1¾ miles east-north-eastward of Hutau shan, and Hut rocks, consisting of rocky ledges partly above water, extend about 6 cables eastward; Hut islet lies about a cable within the eastern end of these rocks. Tagau rock, with a depth of 3 feet (0m9) and foul ground northward, lies about 3 cables south-south-westward of Hut islet. Although a considerable swell runs round Hut islet, fairly good shelter with winds northward of east-north-east may be obtained southward of Tagau point, in depths of from 4 to 6 fathoms (7m3 to 11m0), sand, with a fort about 4 cables west-north-westward of Tagau point bearing 348°.

The coast between Tagau point and Crab point, about 3 miles north-north-eastward, consists of low sandhills; Two Boulder point, nearly one mile northward of Tagau point, has red sandhills and cliffs 30 feet (9m1) high. Crab point is the extremity of a prominent headland having several peaks, the highest being 236 feet (71m9) high; there is a large boulder on the western part of the headland. Two rocks, which dry, lie close off the southern side of the headland, and 6 cables west-south-westward of Crab point is a rock which dries 13 feet (4m0).

Charts 1760, 1968, 2661b, 1262.

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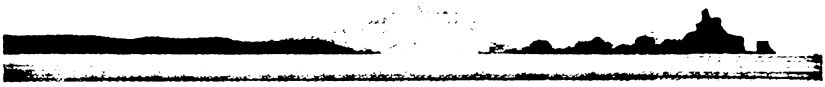
Chart 811, plan of anchorage between Black head and Crab point.

with other rocks around. Two rocks, each about 10 feet (3m0) high, lie on the beach about 1¾ miles northward of Crab point. A remarkable peaked sandhill rises close to the coast about 2¾ miles northward of Crab point, the coast between being low and sandy; Black point, dark, table-topped, and rugged, lies about 8 cables eastward of the sandhill. Shun rock, with a depth of less than 6 feet (1m8), lies about 6 cables eastward of Black point.

Knob rock, about 4¼ miles eastward of Hut islet, has a boulder on its summit.



Land near Red Bay *Knob rock, from the south-south-eastward.*

(Original dated 1865)

Baker rock, about one mile north-eastward of Hut islet, has a depth of 3 feet (0m9) over it, and lies on the southern side of a shoal with depths of less than 5 fathoms (9m1). A shoal, with depths of from 3¼ to 5 fathoms (5m9 to 9m1), extends nearly one mile in a northerly direction from a position about 6 cables westward of Baker rock; a 4¾-fathom (8m7) patch lies between the northern end of this shoal and Spire islet.

Spire islet (*Lat. 23° 56′ N., Long. 117° 48′ E.*), about one mile north-north-eastward of Baker rock, is the south-eastern of a group of rocky islets lying on a sunken plateau with depths of less than 5 fathoms (9m1); a detached shoal, with a least depth of 4¼ fathoms (7m8), lies off the western side of this plateau. A square pillar of rock rises to an elevation of 69 feet (21m0) on Spire islet; *see* view on chart 811.

Cleft islet lies about one mile northward of Spire islet, and Outer Cleft islet is about 4 cables eastward of the former. A rock above water lies about one cable northward of Cleft islet, with foul ground between, and about 2 cables further northward are Cleft rocks; the southern of these rocks has a depth of one foot (0m3), and the northern is awash. Thomson rock, with a least depth of 3 fathoms (5m5) over it, lies about three-quarters of a mile north-eastward of Cleft islet; a 5-fathom (9m1) patch lies about 6 cables eastward of this rock. Pass rock, with a depth of one fathom (1m8), lies about one mile northward of Cleft islet.

Blakeney pass.—Directions.—Blakeney pass is the inshore passage between the coast from Tagau point to Black point and the off-lying islets and dangers; it is useful for steam vessels of low power proceeding against the north-east monsoon.

From the southward, or from Tagau point anchorage, vessels should pass half a mile southward of Hut islet so as to clear Tagau rock; when the peaked sandhill near Black point comes in line with Crab point, bearing 014°, keep this mark on until Knob rock is in line with Spire islet, bearing about 119°, when course should be altered to pass between Crab point and Cleft islet. Town hill in line with Crab point, bearing 237° astern, leads between Cleft rocks and Pass rock, and north-westward of Thomson rock; care must be taken, however, that the vessel is on this leading mark before Knob rock opens north-eastward of Cleft islet.

Charts 1958, 1760, 1968, 2661b, 1262.

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Chart 811, plan of anchorages between Black head and Crab point.

The track just described leads over the extensive shoal, with a least depth of 3¼ fathoms (5m9), lying between Hut islet and Spire islet. To obtain a depth of not less than 6 fathoms (11m0), Hut islet should be rounded at a distance of about a quarter of a mile, and then kept astern bearing 190°; when Spire islet bears 090° a north-easterly course may be steered to pass between Crab point and Cleft islet, thence following the track described above.

Chart 1760, plan of Red bay.

Red bay.—Dangers.—Red bay lies between Black point and the southern extremity of a headland nearly 2 miles north-eastward; Cork point, about one mile farther north-eastward, is the north-eastern extremity of this headland, and a reef extends about 4 cables eastward from it. The land behind the bay consists of low red sandhills.

Shun rock, about 6 cables eastward of Black point, has been described on page 82; the north-eastern entrance point of the bay in line with the southern Black rock, bearing about 056°, leads close south-eastward of this danger. Black rocks, about half a mile south-westward of the north-eastern entrance point of the bay, are 55 feet (16m8) high; a reef, which dries, extends about 2½ cables north-westward from these rocks, leaving a boat passage between it and the mainland. A reef, which dries, lies about 6 cables north-westward of Black rocks. There is a creek, with a village on the western side of the entrance, on the northern side of the bay; the entrance to this creek dries.

Red bay affords fairly good anchorage, in any convenient position, for small vessels during the north-east monsoon; the northern part of the bay is, however, shoal.

Chart 1760.

Coast.—Islets and dangers.—Mount Edmond, about 6 miles north-westward of Cork point, is a good landmark. House hill, on the coast about 8½ miles north-eastward of Cork point, is low and has the ruins of a house on its summit. House hill point is the southern extremity of an islet connected with House hill at low water; a reef, with three drying patches of rock on it, extends three-quarters of a mile south-south-westward from this rock. A group of rocks, just above water, lies nearly 4 miles south-westward of House hill and half a mile offshore. A shoal inlet, known as Chung chou by the natives, runs some distance inland along the western side of House hill; there is a sandbank, which dries in places, across the entrance. Two peaked sandhills, 300 to 400 feet (91m4 to 121m9) high, lie fully one mile northward of House hill point.

Lim chin su or Notch islet, about 2¾ miles north-eastward of House hill point and close offshore, is of basaltic formation; its summit is somewhat steep and square. Reefs extend a quarter of a mile southward and half a mile north-westward from the islet, and there are depths of 5 fathoms (9m1) and less for fully three-quarters of a mile eastward. Temporary shelter can be obtained under the lee of this islet during the north-east monsoon.

Ling mun kao or North Merope, about 3 miles eastward of Lim chin su, is a reef of pinnacle rocks, the highest of which dries 8 feet (2m4).

Chapman patch, about 2 miles north-eastward of Lim chin su and one mile offshore, is a rocky patch with a depth of 2 fathoms (3m7), except at the eastern end, where there is a pinnacle rock with a depth of only 5 feet (1m5).

Charts 1968, 2412, 1760, 2968, 2661b, 1262.

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Chart 1760.

Out-lying islands and dangers.—Lamtia islet (*Lat. 24° 08′ N., Long. 118° 02′ E.*), about 3¼ miles south-eastward of House hill point, is of basaltic formation and rises steeply on its southern side; a reef extends about half a mile north-westward from this islet.

South Merope, a shoal with a least depth of 5 feet (1m5), lies with its south-western end about 3 miles south-eastward of Lamtia islet, and there are depths of less than 5 fathoms (9m1) for 5 miles north-eastward of this position.

Chapel island or Tung-ting-tao, nearly 11 miles east-north-eastward of Lamtia islet, is of basaltic formation, 180 feet (54m9) high, with steep sides and a grassy top, and is perforated at its southern end; there is also a remarkable mound at either end.

Rambler shoal, about 3 miles north-westward of Chapel island, is a small patch with a depth of 4¼ fathoms (8m2).

Erl King shoal, about 5 miles north-westward of Chapel island, has a least depth of 2¾ fathoms (5m0).

So far as is known there are no other shoals off this part of the coast except those already described; the depths, however, are very irregular in this neighbourhood, and there are several patches with depths of from 5 to 6 fathoms (9m1 to 11m0). Vessels of deep draught should, therefore, always pass outside Chapel island.

Light.—Fog signal.—A light is exhibited, at an elevation of 227 feet (69m2), from a black circular tower, 63 feet (19m2) in height, situated on the summit of Chapel island. The keepers' dwellings and boundary wall are white.

A fog signal is sounded from the lighthouse.

Tidal streams.—At Chapel island, in the south-west monsoon, the tidal stream has been observed to set northward during the rising tide at Amoy, with a maximum rate of 1½ knots, and south-westward during the falling tide there, with a maximum rate of about 2 knots at spring tides.

About 5 miles westward of Chapel island, in the north-east monsoon, the tidal stream sets west-south-westward at the commencement of the falling tide, then south-westward, and the last three hours south-eastward; during the rising tide the tidal stream sets northward. It thus appears that the tidal streams near Chapel island are somewhat of a rotatory nature.

Chart 1760, plan of Tingtai bay.

Coast.—Tingtai bay.—Tin hai or Table head (*Lat. 24° 15° N., Long. 118° 06′ E.*), about 8 miles north-eastward of House hill point, is a prominent headland with a flat top; the ruins of a walled town are situated on a hill about 1½ miles northward of the head.

Tingtai bay, on the western side of the headland, affords fair shelter for small vessels during the north-east monsoon. A rocky patch, with a least depth of 2 fathoms (3m7), lies in the south-western part of the bay and nearly 2 miles west-south-westward of Table head.

Discoloured and broken water was reported, in 1927, to extend for a considerable distance from the coast between Table head and Chinha point, nearly 3 miles north-eastward.

Chart 1767.

AMOY HARBOUR AND APPROACHES.—Amoy harbour, consisting of an Outer and Inner harbour, is available for vessels

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Chart 1767.

of any draught at all times. The approach to the Outer harbour is bounded south-westward by the coast between Chinha point and Pagoda point, about 5½ miles north-westward, with the off-lying islands and dangers; the northern side of the approach is formed by Kimoi and Little Kimoi islands, with various shoals and spits extending from their southern sides.

Outlying dangers.—Channel shoals are two ridges of sand and shells about half a mile apart. The south-eastern ridge, with a least depth of 3¾ fathoms (6m9), lies about 4 miles eastward of Chinha point; the north-western ridge has a least depth of 4¾ fathoms (8m7). A table giving the directions and rates of the tidal streams at Channel shoals is given on chart 1767.

Westacott shoals, about 7 miles west-north-westward of Chinha point, are a group of shoals with a least depth of 4¾ fathoms (8m7).

South-western side of the approach.—Islands and dangers.—The coast between Chinha point and Pagoda point consists of a number of rocky points with sandy bays between. Nantai pagoda, 60 feet (18m3) in height, stands on the summit of a mountain nearly 2¾ miles south-westward of Pagoda point and is conspicuous.

Banterer reef consists of a number of drying rocks lying on a spit, with depths of less than 5-fathoms (9m1), extending fully three-quarters of a mile north-eastward of Chinha point; the reef must be given a wide berth, as there is a depth of 4 fathoms (7m3) about a quarter of a mile south-eastward of its outer extremity. The summit of Hwangkwa islet, situated about 6½ miles northward of Chinha point, in line with the eastern side of Wu seu island, bearing 353°, leads fully 3 cables eastward of this danger.

Dome rock lies about 2 miles northward of Chinha point and 6½ cables offshore; this rock dries 10 feet (3m0) and there is foul ground around. A reef, which dries near its outer end, extends about 6 cables from the coast south-westward of Dome rock.

Wu seu island lies with its southern end about one mile northward of Dome rock, and is divided into two hilly parts by a low neck of sand, on the eastern side of which is a shallow bay with a sandy beach; there are sandy beaches along the western side of the island, and on the largest of these is a fishing village. Wu an island, with a number of islets, rocks, and reefs, lies between Wu seu and the mainland; the narrow channels on either side of Wu an island are not recommended, as the strong tidal streams render navigation difficult.

Chauchat rocks (*Lat. 24° 20′ N., Long. 118° 10′ E.*) are two rocks above water about a cable apart; the south-eastern and higher of the two lies about 6 cables eastward of the east point of Wu seu island and is 9 feet (2m7) high. These rocks are covered by the *red* sector of Tsing seu island light (page 87) between the bearings of 302° and 000°; the channel between them and Wu seu island is deep and clear.

Chin tseao rocks consist of an islet with a few shrubs on it, lying about half a mile north-westward of the north point of Wu seu island, and several drying rocks off its western side, all lying on a shoal bank.

Northern side of the approach.—Kimoi island.—Kimoi (Quemoy) island lies in the northern side of the approach to Amoy

Chart 1760, 1968, 2412, 1262.

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Chart 1767.

harbour; its northern coast forms the southern side of Huitow bay (page 86); Dodd head, the eastern extremity of the island, and Dodd island, with its light, are described on page 99.

Liau lu head, the south-east point of Kimoi island, is a peaked islet, connected to the main island by a reef. Liau lu hill is situated about 3¼ miles northward of the head. Southward of Liau lu head the tidal stream sets westward during the rising tide, and eastward during the falling tide.

Liau lu bay lies between Liau lu head and a point about 5½ miles westward. A bank, with depths of less than 3 fathoms (5m5), extends about one mile from the eastern shore of the bay. The western part of the bay is foul; the outermost dangers are a 3½-fathom (6m4) patch lying fully 1½ miles eastward of the western entrance point, and a 2½ fathom (4m6) patch lying nearly 1½ miles east-north-eastward of the same point. A conspicuous rock, 49 feet (14m9) high, lies nearly half a mile eastward of the western entrance point, and another rock, 16 feet (4m9) high, lies about 3 cables east-south-eastward of the same point; there are other rocks, above and below water, around.

Anchorage, sheltered from winds between north-west and north-east, can be obtained, in a depth of 4¾ fathoms (8m7), mud and sand, with Liau lu head bearing 095° and Liau lu hill bearing 015°; small vessels can anchor closer in, in a depth of 3¾ fathoms (6m9). When the north-east monsoon is at its strength, however, this anchorage is unsuitable, as a heavy swell then sets in.

Kimoi pagoda, 39 feet (11m9) in height, stands on the summit of a hill on the south-west coast of Kimoi island and about 6 cables south-eastward of Fort point, the western extremity of the island.

Dangers southward of the west point of Kimoi island.—Buoy.—Kimoi bank, the southern part of which is named Kimoi spit, extends fully 3 miles southward from Fort point and dries in places; one patch, about one mile southward of Fort point, dries as much as 9 feet (2m7). Although a swell breaks on this bank, when the water is smooth it is not always marked at or near high tide; the western edge is steep-to. A red whistle-buoy, marked "Quemoy" in white letters, is moored off the southern extremity of Kimoi spit; vessels should not pass between this buoy and Kimoi island.

Spit bank is practically a continuation in a south-south-easterly direction of Kimoi spit; the least depth on this bank, 3¾ fathoms (6m9), is about 3½ miles southward of Fort point.

Little Kimoi island.—Little Kimoi island lies with its south-east point about one mile north-westward of Fort point. The north-eastern part of the island is hilly, attaining an elevation of 328 feet (100m0); the south-western end consists of lower sandhills and cultivated ground.

Phaktia islet lies about 1¾ cables south-eastward of the south point of Little Kimoi island, but is not noticeable against the land behind. A flat, with general depths of less than 3 fathoms (5m5), extends off the whole of the southern side of Little Kimoi island, up to a distance of about 1½ miles southward of Phaktia islet.

Some drying rocks lie about 4 cables westward of the south-west point of Little Kimoi island.

Port Kimoi.—Dangers.—Port Kimoi lies between Kimoi island and Little Kimoi island, and has general depths of from 6 to 11

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Chart 1767.

fathoms (11m0 to 20m1) in the fairway, but the bottom is uneven. It is entered from the southward by a deep passage, about half a mile wide, between the western side of Kimoi bank and the eastern side of the flat extending southward from Little Kimoi island.

The eastern side of the port is occupied by a partly drying flat, with drying boulders on it, extending fully half a mile from the west coast of Kimoi island; shoal water, with several rocks, extends about 4 cables from the east coast of Little Kimoi island.

Middle ground consists of a group of shoal patches lying in the middle of Port Kimoi; the shoalest of these, with a depth of 3¼ fathoms (5m9), lies nearly 1½ miles northward of Fort point (*Lat. 24° 25′ N., Long. 118° 17′ E.*). A 2¾-fathom (5m0) patch lies about the same distance north-north-eastward of Fort point; the positions of the other shoals in the port can best be seen on the chart.

Port Kimoi affords shelter from all winds, and is available in a typhoon.

A stone jetty extends from the eastern shore of the port, but its head dries.

Directions for Port Kimoi.—From the eastward, after passing betweeen Spit bank and Westacott shoals, vessels should continue westward until a conspicuous summit south-westward of West peak (page 87) is seen between the north-east part of Little Kimoi island and a small islet, 23 feet (7m0) high, lying close off this point, bearing 005°; *see* view on chart 1767. Keep this mark on until Kimoi pagoda bears 100°, when a north-easterly course may be steered into the port.

Unless of light draught, vessels should not proceed farther north-eastward than the 328-foot (100m0) summit of Little Kimoi island bearing 297°, as Middle ground and other patches lie north-eastward of this line of bearing. The port is sheltered from the northward, but with southerly winds a swell sets in and renders the anchorage uncomfortable.

Islands and dangers in the entrance.—Lights.—Tsing seu island, nearly 1½ miles east-north-eastward of Pagoda point and on the south-western side of the main entrance channel to the Outer harbour, is flat topped, but has a slight indentation in the middle. The south-eastern side of the island is steep-to, but a spit extends about 2 cables from its north-western side. A rock, almost awash, lies about 3 cables south-westward of Tsing seu island, and close north-eastward of this rock is a rock with a depth of 1¼ fathoms (2m3), whilst a third rock, with a depth of 2¾ fathoms (5m0), lies a short distance northward. The out-going tidal stream sets strongly on to the island.

A light is exhibited, at an elevation of 130 feet (39m6), from an octagonal tower, 33 feet (10m1) in height, painted red and white in vertical stripes, situated on the northern slope of Tsing seu island; the keepers' dwellings and boundary wall are white. A fog signal is sounded from the lighthouse.

Chih seu, about three-quarters of a mile north-eastward of Tsing seu, Tao sao, and Hwangkwa are three islets lying together on a rocky bank on the north-eastern side of the main entrance to the Outer harbour. Shoal water extends about one cable south-westward from Chih seu, and a 4¼-fathom (8m7) patch lies about a quarter

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Charts 1767.

of a mile southward of this islet; a 1¾-fathom (3m2) patch lies about 2 cables east-south-eastward of Chih seu. Foul ground, including a rock which dries 12 feet (3m7), extends for nearly half a mile north-westward of Tao sao.

Seao tan island lies about half a mile eastward of Hwangkwa and has the remains of some ancient forts on it; a small islet lies on a spit extending about 2 cables from its east point, and some rocks lie close off the north-western side of the island. A 3-fathom (5m5) patch lies about 3½ cables south-eastward of the south point of the island, and depths of less than 5 fathoms (9m1) extend for a further half mile in this direction.

Taitan island lies about 4 cables north-eastward of Seao tan island, and both are just within the extremity of a shoal flat extending about 3 miles south-eastward from the south-eastern side of Amoy island. Taitan island is divided into two parts by a low neck; the southern side of the south-eastern part is 280 feet (85m3) high and bold; on the north-western part there is a temple. A rock, with a depth of less than 6 feet (1m8), lies on the northern end of a shoal about a quarter of a mile eastward of the eastern end of the island.

A light is exhibited, at an elevation of 300 feet (91m4), from a white hut, 10 feet (3m0) in height, situated on the summit of Taitan island. The lantern is raised through the roof of the hut when lighted, but the building is not conspicuous.

Charts 3449, 1767.

Outer harbour.—The Outer harbour extends in a general north-westerly direction for about 7 miles from its entrance between Tsing seu island and Chih seu (*Lat. 24° 23′ N., Long. 118° 08′ E.*), and includes the southern part of the channel between Kulangseu island and Sungseu peninsula. The harbour is easy of access, and a pilot is unnecessary; it has general depths of from 7 to 16 fathoms (12m8 to 29m3), good holding ground.

The south-western side of the Outer harbour is formed by the coast between Pagoda point and Ku ching sia, about 5½ miles north-westward, and by the estuary between this coast and Sungseu peninsula; the northern side is formed by Amoy island, Kulangseu island, and the eastern part of Sungseu peninsula.

Southern side.—Island.—Dangers.—Buoy.—The coast between Pagoda point and Su a be, nearly 3½ miles north-westward, forms a bight encumbered by partly drying flats terminating seaward in Taipan shoal, which extends in a north-westerly direction from a position about midway between Pagoda point and Tsing seu island to unite with the coast at Su a be. There are general depths of from 1¼ to 3 fathoms (2m3 to 5m5) on Taipan shoal, but about midway between Pagoda point and Su a be there is a patch with a depth of only 3 feet (0m9); within the south-eastern end of the shoal there is deeper water until northward of Tsao po, two islets lying about three-quarters of a mile north-westward of Pagoda point. Kang be kang creek is entered westward of Tsao po, but dries 8 feet (2m4), except a narrow channel in the middle of the entrance.

Chart 3449.

The coast between Su a be and Ku ching sia, about 2½ miles westward, rises a short distance within to hills over 200 feet (61m0) high, and is mostly fringed by a broad, drying bank of mud and sand with

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Chart 3449.

boulders on it. Shoal water, with drying rocks, extends about 2 cables from Su a be.

Chinta, a rock with a depth of 1¾ fathoms (3m2), lies fully one mile north-westward of Su a be and about 4 cables offshore; a 3½ fathom (6m4) patch lies about one cable eastward of the rock. About a quarter of a mile westward of Chinta is a bank, with depths of less than 5 fathoms (9m1), which extends about three-quarters of a mile northward from the coast.

Kiseu island, in the western part of the Outer harbour, lies with its eastern extremity about 1¼ miles northward of Ku ching sia. A shoal, with depths of less than 3 fathoms (5m5), extends fully three-quarters of a mile eastward from the island.

Sungseu peninsula, in the north-western part of the Outer harbour, is hilly; the highest peak, named Kieng kau chem, attains an elevation of 442 feet (134m7). Ching pi, the south-eastern extremity of the peninsula, rises to a hill 273 feet (83m2) high, with a yellow tower on its summit. Cass spit, with depths of less than 3 fathoms (5m5), extends about 4 cables south-eastward from Ching pi. Tien buta or Minerva rock, with a least depth of one fathom (1m8) over it, lies nearly 4½ cables south-eastward of Ching pi; a black conical buoy, marked "Minerva" in white letters, is moored about one cable eastward of this rock. Vessels should not pass between this buoy and Sungseu peninsula. The north-eastern extremity of the peninsula is occupied by the buildings of the Standard Oil Company, including some large oil tanks. Four piers extend from the coast here; the northernmost of these is a stone landing pier; the southernmost pier is 400 feet (121m9) in length; the next pier northward is 600 feet (182m9) in length, and a vessel 550 feet (167m6) long, with a draught of 30 feet (9m1), can berth here. There are four mooring buoys off the head of the latter pier.

Northern side.—Dangers.—Buoy.—Pechiah thau, the south point of Amoy island, is sandy. The edge of the coastal bank, with depths of less than 3 fathoms (5m5), which extends from this point in a south-easterly direction to Seao tan and Taitan islands (page 88), lies about one mile southward of Pechiah thau; this bank gradually decreases in width westward, so that by Fan-chiang-shih or Cornwallis stone, situated on the beach about 2½ miles westward of Pechiah thau, it is only about 1½ cables wide. Several rocks, which dry, lie within a distance of 1½ cables southward and half a mile south-westward of Pechiah thau. Kwang li tai summit (chart 1767) lies about 2½ miles north-north-westward of Pechiah thau, and is the highest peak of the hilly land in the southern part of Amoy island.

Chart 1764.

Fan-chiang-shih is a triangular-shaped rock, 10 feet (3m0) high, and is whitewashed. Tso-yen-shih or Stevens rock lies about 3½ cables south-westward of Fan-chiang-shih, and has a depth of 19 feet (5m8) over it; a black buoy, surmounted by a black spherical cage, is moored off the eastern side of the rock. Yu-yen-shih or Imperieuse rock, with a depth of 15 feet (4m6) over it, lies about half a cable westward of Tso-yen-shih.

Charts 1764, 3449.

Kulangseu island lies close south-westward of Amoy island, the channel between forming a portion of the Inner harbour. The island

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Charts 1764, 3449.

is hilly and picturesque, with large dark boulders on the hills, and numerous European houses surrounded by trees on the slopes. The summit is Yen-tzu-ting or Joss hill, 287 feet (87m5) high, situated on the southern side of the island; the flagstaff of the lookout station, which stands on a whitewashed boulder on Yen-tzu-ting, is conspicuous from the Outer harbour. A conspicuous boulder, named Ying-pi-yen or Wellington's nose, stands on a hill 107 feet (32m6) high in the northern part of the island. The British Consul's residence, situated in the south-eastern part of the island, is also conspicuous.

A shoal, with depths of 30 feet (9m1) on its outer edge and decreasing gradually towards the coast, extends nearly three-quarters of a mile south-eastward from the south-eastern side of Kulangseu island, between Fu-ting-shih or Bluff, the east point of the island, and Hsiao-yin-tou or Beveridge point, about 4 cables south-westward; the inner part of this shoal dries. Wai-chien-chiao or Rugged islet lies about 2 cables eastward of Hsiao-yin-tou and close offshore. Yin-tou-shih (Intau), a ridge which dries, having two rocks on it 15 and 6 feet (4m6 and 1m8) high, respectively, lies about one cable south-eastward of Wai-chien-chiao.

The coast of Kulangseu island between Hsiao-yin-tou and Quarry point, about three-quarters of a mile north-westward, is bordered by flats which dry in parts. Hou-tung-yen or Anson bluff, 70 feet (21m3) high, lies about midway between these two points; a reef, which dries 10 feet (3m0), extends about half a cable southward from Hou-tung-yen. Anson spit, about 2½ cables westward of Hou-tung-yen, is a narrow ridge with a least depth of 1¾ fathoms (3m2). A rock, which dries 15 feet (4m6), lies about one cable southward of Quarry point, and two rocks, which dry, lie about half a cable westward of this point.

The west coast of Kulangseu island, between Quarry point and Chow-tzu-wei (Chiu a boi), a small peninsula about half a mile northward, is fringed by a flat which dries; the outer edge of this flat is steep-to, but there are several detached dangers close outside it. Ching sia is a group of rocks lying on the flats about 1½ cables northward of Quarry point, and one of them is 23 feet (7m0) high. Chiong kun ta is a rock one foot (0m3) high, with several rocks which dry around, lying about one cable westward of the northern extremity of Chow-tzu-wei; a ridge, with depths of from 4¼ to 5¾ fathoms (7m8 to 10m5), extends nearly 2 cables south-south-westward from Chiong kun ta.

Anchorages in the Outer harbour.—Vessels can anchor off the southern entrance to the channel between Amoy island and Kulangseu island, in a depth of about 39 feet (11m9), mud, about 1½ cables northward of Yu-yen-shih, with Fan-chiang-shih bearing 090°, and Huang-chiao or Thumb rock, situated about three-quarters of a cable eastward of Fu-ting-shih, bearing 326°; this position is as near the town as a vessel can approach without having to moor. *See* also Article 3 of the Harbour regulations on page 94.

Anchorage can be obtained off the southern side of Kulangseu island, in depths of from 7 to 10 fathoms (12m8 to 18m3), within a distance of half a mile south-westward of Hsiao-yin-tou. In 1932 H.M.S. *Hermes* anchored with the signal station near Fu-ting-shih bearing 036°, distant 1 4/10 miles, with good holding ground of sand

Charts 1767, 1760, 1968, 2412, 1262.

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Charts 1764, 3449.

and mud. In 1935 H.M.S. *Suffolk* anchored with this signal station bearing 026°, distant about three-quarters of a mile, but strong eddies were experienced one hour before and after slack water during spring tides; vessels anchored about one cable westward of this position were not affected.

There is anchorage, in depths of from 7 to 12 fathoms (12m8 to 21m9), in the southern parts of the channel between Kulangseu island and Sungseu peninsula.

Anchorage is available in a typhoon about 1¼ miles westward of the light-structure on Taitan island (chart 1767).

Landing.—In fine weather landing can be effected by pulling boats on the sandy beach immediately southward of the telegraph office situated near Hsiao-yin-tou, but permission must be obtained first from the telegraph office. Landing can be effected at any state of the tide on Chiang-tzu-nou, north-westward of the telegraph office, but it is more exposed than the former beach.

Charts 3449, 1767.

Prohibited anchorage.—Owing to the existence of submarine telegraph cables, anchorage is prohibited southward of Kulangseu island within the area defined by pecked lines on the charts.

Tidal streams.—The tidal streams in the Outer harbour set north-westward during the rising tide and south-eastward during the falling tide, with a maximum rate of about 2 knots at spring tides, except off Su a be, where this rate may be exceeded.

The tidal streams between Kulangseu island and Sungseu peninsula set northward during the rising tide and southward during the falling tide, with a maximum rate of from 2 to 3 knots at spring tides and one knot at neap tides.

Directions.—Vessels bound for Amoy from the southward, when steering for Chapel island (chart 1760) should give South Merope (page 84) a wide berth. Chapel island can be passed at a distance of about half a mile on either side, but vessels of deep draught should pass eastward of it; thence pass eastward of Channel shoals. When Tsing seu island is open north-eastward of Wu seu island course may be shaped for Taitan island; when Su a be is well open north-eastward of Tsing seu island, bearing about 304°, which leads north-eastward of Chauchat rocks, vessels can steer for the entrance of the Outer harbour, passing between Tsing seu island and Chih seu. Nantai pagoda is a good landmark, but it is often obscured by clouds during the south-west monsoon.

Vessels approaching from the north-eastward should give Dodd island (page 99) a berth of about 2 miles to avoid the off-lying shoals.

Thence pass Liau lu head at a distance of not less than one mile nor in a depth of less than 6 fathoms (11m0); course may then be shaped to pass southward of Kimoi spit whistle-buoy, but vessels of deep draught must pass southward of Spit bank. After passing the spit the entrance to the Outer harbour may be steered for.

Chart 1764.

Inner harbour.—The Inner harbour lies between Amoy and Kulangseu islands, and also includes the northern part of the channel between Kulangseu and the mainland, as defined in Article 2 of the Harbour regulations on page 94. That portion of the Inner harbour

Charts 1760, 1968, 2412, 1262.

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Chart 1764.

between Amoy and Kulangseu islands is somewhat restricted by rocks and banks extending from both shores; the bottom in this part of the harbour is very uneven, and if cables foul the rocks they are only recovered, if at all, with great difficulty.

Vessels should not attempt to enter until they are boarded by the harbour master or a pilot, as they must be berthed and the harbour is frequently crowded with shipping. There are several mooring buoys for vessels of the various steamship companies using the harbour, and the positions of these are best seen on the chart.

Island.—Dangers.—Buoys and beacons.—Yu-yen-shih and Tso-yen-shih, off the southern entrance to the Inner harbour, and the bank extending south-eastward from Kulangseu island, have been described on page 89.

Wai-hu-tin-chiao or Coker rock, lying in the middle of the southern entrance and about 4 cables south-eastward of Fu-ting-shih, is awash; foul ground extends about a quarter of a cable southward and south-eastward of the rock. Chang-fu-chien (Chang hock kiang), a rock with a depth of 14 feet (4^{m}3), lies about half a cable north-westward of Wai-hu-tin-chiao. A black and white chequered buoy is moored about three-quarters of a cable eastward of Wai-hu-tin-chiao, and a red and white chequered buoy is moored about the same distance westward of it.

Chung-chiao or Kaiser rock, also known as Middle rock, with a least depth of 14 feet (4^{m}3), lies nearly 1½ cables northward of Wai-hu-tin-chiao; a black buoy is moored off its north-eastern side. A rock, with a depth of 28 feet (8^{m}5) over it, lies about one cable west-north-westward of Chung-chiao.

Nei-hu-ting-chiao or Brown rocks consist of three rocky heads, and the southernmost, with a depth of 7 feet (2^{m}1), lies about 2 cables eastward of Fu-ting-shih; the other two have depths of 13 and 14 feet (4^{m}0 and 4^{m}3) over them, respectively. A red and white chequered buoy, surmounted by a black spherical cage, is moored off the south-western side of these rocks, and a similar buoy, painted in black and white chequers, is moored off the north-eastern side.

Huang-chiao or Thumb rock, 30 feet (9^{m}1) high, lies about three-quarters of a cable eastward of Fu-ting-shih and just within the outer edge of a rocky ledge extending from that point.

Chang-yu-chiao (Chiotah rock), on the western side of the harbour and about 3¾ cables northward of Fu-ting-shih, dries; it is marked by a black granite obelisk, 17 feet (5^{m}2) in height, surmounted by a white sphere. Yao-shih or Iltis rock, with a depth of 5 feet (1^{m}5), lies about half a cable south-eastward of Chang-yu-chiao.

Tieh-shih or Therese rock, with a depth of 5 feet (1^{m}5), lies close off the eastern shore of the harbour and about 2¼ cables east-north-eastward of Chang-yu-chiao.

Kiang-hsin-chiao (Kangsimtah), nearly 1½ cables north-westward of Chang-yu-chiao, is a rocky reef which dries 11 feet (3^{m}4); a black granite obelisk, 15 feet (4^{m}6) in height, stands on its north-eastern part, and there is a tide pole near the beacon.

Cha-shih or Chapman rock, with a least depth of 19 feet (5^{m}8), lies about 1½ cables northward of Kiang-hsin-chiao beacon.

Hung-niu-shih or Devonhurst rock, with a depth of 13 feet (4^{m}0), lies nearly 3¼ cables north-westward of Kiang-hsin-chiao beacon.

Charts 3449, 1767, 1760, 1968, 2412, 1262.

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Chart 1764.

Kuan-chai-chiao or Alibi rock, nearly 1¼ cables north-westward of Hung-niu-shih, dries, and is marked by a black granite obelisk, 22 feet (6m7) in height.

Nei-sha-shih or Harbour rock, with a least depth of 9 feet (2m7), lies about 1¼ cables north-eastward of Kuan-chai-chiao; a red and black chequered buoy is moored off its north-western side. A rocky patch, with a least depth of 28 feet (8m5), lies about 1¼ cables north-north-westward of Nei-sha-shih.

A flat, which dries, extends about 2 cables northward from Yen-tzu-wei (Ieboi), the northern extremity of Kulangseu island, and this flat is prolonged northward by Niao-fen-chiao or Isere rocks, and terminates about half a mile northward of Yen-tzu-wei in Nei-tu-wei or Kellett spit; a buoy, painted red and black in vertical stripes, is moored off the eastern side of Nei-tu-wei.

A bank, with depths of less than 30 feet (9m1), extends from the eastern side of the northern entrance of the Inner harbour to within 1¼ cables of Nei-tu-wei. Pan-shih or Banner rock, with a depth of 6 feet (1m8) over it, lies about 3 cables northward of Nei-sha-shih, and some rocks, which dry, lie about 1¼ cables farther northward.

Eight perches, each surmounted by a white sphere, are placed on rocks lying close to the western shore of the harbour; the positions of these can best be seen on the chart.

Hou-yu (Hauseu) or Monkey island lies about three-quarters of a mile northward of Chow-tzu-wei; a ridge, with depths of from 2 to 5 fathoms (3m7 to 9m1), extends nearly a quarter of a mile south-south-westward from the southern side of this island.

Lights.—Two lights, disposed vertically, are exhibited from a derrick on the head of the Petroleum pier on the eastern side of the Inner harbour opposite Fu-ting-shih.

A light is exhibited from a position in front of the Custom house, situated in the northern part of the eastern side of the harbour.

A light is exhibited, at an elevation of 18 feet (5m5), from a granite obelisk, painted black and white in horizontal bands, situated on Kou-tou-chiao (Kau thau ta), on the eastern side of Kulangseu island. This rock, which dries 9 feet (2m7), lies close north-eastward of Lung-tou (Ling tow) jetty and about 3¾ cables north-north-westward of Fu-ting-shih; rocks extend for a further 20 yards (18m3) outside the beacon.

Anchorage.—Mooring berths.—Large vessels of war usually moor from 3½ to 8 cables south-south-westward of Hou-yu; vessels at single anchor are liable to drag, as the bottom is soft mud with patches of gravel, but in 1928 H.M.S. *Titania* found good holding ground with the summit of Hou-yu bearing 023°, distant 6½ cables. This anchorage is convenient during the north-east monsoon, when there is generally a swell on Kulangseu beaches, as fairly good landing can be effected at the disused Custom house on Chow-tzu-wei (*Lat. 24° 27′ N., Long. 118° 03′ E.*). Good anchorage can also be obtained between Hou-yu and the coast of Amoy island south-eastward.

There are eighteen berths at mooring buoys in the Inner harbour; of these one is available for vessels up to 600 feet (182m9) in length, two for vessels up to 500 feet (152m4) in length, and the remainder are suitable for vessels from 200 to 400 feet (61m0 to 121m9) in length. The positions of these mooring buoys can best be seen on the chart.

Charts 3449, 1767, 1760, 1968, 2412, 1262.

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Charts 1764.

There are two pontoons, with a depth of 22 feet (6m7) alongside, on the eastern side of the harbour and westward of the Tongwen Institute.

Submarine cables.—Submarine telephone cables cross the Inner harbour between "N" and "J" buoys; transit beacons on either side mark the direction of these cables.

Tidal streams.—In the Inner harbour the tidal streams set northward and southward, each running for about 6½ hours. The average rate of the north-going stream is from 2 to 3 knots at spring tides; the rate of the south-going stream during the first three hours is about 3 knots. In the middle of the harbour the north-going stream runs from three-quarters of an hour before low water to a quarter of an hour after high water; the tides are considerably influenced by the force and duration of the wind.

Charts 1764, 3449.

Harbour regulations.—The following are extracts from the Harbour regulations for the Port of Amoy:—

Art. 1.—The term "vessel" in these regulations refers to vessels of foreign type. Regulations concerning native-type craft are embodied herein only in so far as is necessary for their due control when working in connection with foreign type vessels.

Art 2.—The upper limit of the harbour is a line drawn from Hsint'ienti (north-westward of Amoy city and close northward of Amoy dock) north-westward through the southern Chalk islet to the mainland opposite; the lower limit is a line drawn south-eastward from Pechiah thau (the south point of Amoy island) to the nearest island and thence to the mainland in the direction of Nantai pagoda.

This area comprises an Inner and Outer harbour. The limits of the Inner harbour are as follows:—

The southern limit is a line drawn 090° from the east point of Wai-chien-chiao to the coast of Amoy island.

The northern limit is a line drawn from the northern extremity of Chow-tzu-wei to the south point of Kiu sung seu, thence from the north point of Kiu sung seu to the south point of Hou-yu, and thence a line drawn 045° from the north-east point of Hou-yu to the upper limit of the harbour.

Art. 3.—The anchorages for foreign-type vessels are:—

(*a*) For vessels other than those provided for in (*b*), (*c*), and (*d*): within the limits of the inner harbour as defined in the preceding article. If, owing to unusual length or draught of vessels, or for other sufficient reason, the anchorages within the Inner harbour would not be convenient, application should be made to the Harbour master, if possible before the vessel's arrival, to assign a suitable berth in the Outer harbour; application should be made at the same time to the Commissioner of Customs for permission to work cargo from the berth so assigned.

(*b*) For mineral oil: within either of the two following areas in the Outer harbour:—

(1) Within the limits of lines drawn south-westward from the north-east point of Kiu sung seu to Ching pi; from Ching pi 090° to the point of intersection of a line drawn

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Charts 1764, 3449.

180° from the north-east point of Kiu sung seu, but limited northward by the line drawn from the northern extremity of Chow-tzu-wei to the south point of Kiu sung seu.

(2) Southward of the lower limit of the Inner harbour to a line drawn from Fan-chiang-shih.

(*c*) For explosives: southward of a line drawn from Ching-pi to Yin-tou-shih.

(*d*) For quarantine purposes: the quarantine anchorage is situated southward of the southern limit of the mineral oil anchorage and off Fan-chiang-shih.

Art. 4.—A vessel entering the port must stop above or below the shipping until the Harbour master has assigned her a berth.

Art. 5.—Vessels having determined berths are allowed to proceed to them without stoppage.

Art. 6.—Vessels shall moor in accordance with instructions received from the Harbour master, and shall not shift their berths without a special permit, except when outward bound after having obtained their clearance papers or through stress of weather.

Art. 7.—Applications for berths of for permission to shift berth must be made at the Harbour master's office by the agents, the master, the first officer, or the pilot in charge, when the necessary instructions concerning the berth will be given. If a vessel is instructed by the Harbour master to shift her berth, she shall do so.

Art. 8.—Vessels having explosives on board shall hoist flag B of the International Code of Signals at the fore by day, and exhibit a *red* light at night; in regard to the discharge of the same they shall abide by the instructions received from the Customs.

Art. 19.—Vessels having any infectious disease on board, or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died, of an infectious disease, shall hoist the quarantine flag on approaching the port, anchor as provided in Article 3 (*d*), and keep the flag flying until pratique has been granted.

Art. 27.—Ballast, ashes, refuse, etc., must not be thrown in to the harbour. Vessels wishing to discharge ashes or other refuse should hoist flag Y of the International Code of Signals at the fore, when a licensed ash-boat will attend and take delivery.

Art 31.—Vessels in the harbour and its approaches are forbidden to proceed at such a speed as renders their wash dangerous to other craft.

Art. 34.—No vessels, except men-of-war, may use swinging booms. Swinging booms should be rigged in from sunset to sunrise.

Art. 36.—All vessels shall keep on board a sufficient number of hands to clear and pay out cables and to handle the vessel in case of emergency. The hawse must always be kept clear. No boats, warps or lines must be made fast to any of the buoys or beacons which constitute harbour marks.

Art. 37.—In case of fire occurring on board a vessel in port, the fire bell must be rung immediately by that vessel and by those above and below her. By day the signal N Q of the International

Charts 1767, 1760, 1968, 2412, 1262.

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Charts 1764, 3449.

code must be hoisted by the burning vessel, if possible, and also by those vessels above and below her; at night a light should be lowered and hoisted repeatedly. The Harbour master should be notified immediately.

Art. 38.—The use of steam whistles, sirens, or other sound signals, except for the purpose of signalling in accordance with the Regulations for Preventing Collisions at Sea or for the purpose of warning vessels of danger, is strictly forbidden.

Port signals.—For signals to be made by vessels requiring a doctor, water-boat, etc. *see* page 40.

Vessels allotted special numbers under the Port Signal Code are required to hoist the same when, approaching the harbour, they are off Wu seu island.

Chart 1764.

Directions.—Vessels usually enter the Inner harbour during the daytime; vessels sometimes leave on a clear night and with a pilot in charge. It is difficult to turn round, and it is not advisable to let go an anchor and turn, as the anchor might foul one of the many buoy moorings on the mushroom-shaped rocks. Vessels arriving during the south-going tidal stream proceed direct into the Inner harbour by the southern entrance; those arriving during the north-going stream pass southward and westward of Kulangseu island, and enter the harbour by the northern entrance. Vessels leaving the harbour during the south-going tidal stream proceed through the northern entrance and round Kulangseu island; those leaving during the north-going stream proceed direct through the southern entrance. With the north-going tidal stream there may be a strong easterly set in the southern entrance to the Inner harbour, which must be guarded against, especially by vessels using the western channel past Chung-chiao, Wai-hu-tin-chiao, and Tso-yen-shih; a westerly set may sometimes occur soon after the south-going stream has commenced in the Inner harbour. There is deep water at the berths in the harbour, and it is, therefore, the length of a vessel that must be taken into consideration when berthing, not her draught. There are two harbour pilots at Amoy, and one should always be employed by vessels entering or leaving the harbour.

To proceed into the Inner harbour by the eastern or Blonde channel, pass eastward of the black buoy marking Tso-yen-shih; thence hold the Amoy island shore, passing eastward of the buoys moored off the eastern sides of Wai-hu-tin-chiao, Chung-chiao, and Nei-hu-ting-chiao, respectively. When past Nei-hu-ting-chiao vessels will pass close eastward of all the dangers on the western side of the harbour by keeping the southern Chalk islet just open north-eastward of the north-eastern side of Hou-yu, bearing 324°. The Chalk islets (chart 1760) consist of four islets extending about three-quarters of a mile in a north-north-east and south-south-west direction; the southern islet is 56 feet (17m1) high, and lies nearly one mile north-westward of Hou-yu; the northern islet is 125 feet (38m1) high; the lower parts of these islets are white.

Chart 3449.

Vessels intending to enter the Inner harbour by the northern entrance pass southward of the shoal water extending south-eastward from Kulangseu island. The wide channel between this island and

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Chart 3449.

Sangseu peninsula presents no difficulty, taking care to give Anson spit, Chiong kun ta (*Lat. 24° 27′ N., Long. 118° 03′ E.*), and the other rocks and shoals off the west coast of Kulangseu island a wide berth. Vessels must pass northward and eastward of Nei-tu-wei buoy; caution must be exercised here, as the directions of the tidal streams are uncertain about the times of high and low water, and the south-going stream sets directly on to the buoy. The southern Chalk islet open north-eastward of the north-eastern side of Hou-yu, bearing 324°, leads close eastward of Nei-tu-wei and Niao-fen-chiao. Vessels should pass at least half a cable westward of the buoy marking Nei-sha-shih; the channel eastward of this rock should not be used.

Chart 1764.

Directions for boats.—Boats making for the Inner harbour from the anchorage southward of Kulangseu island can cross the shoal bank extending south-eastward from this island; the outer limit of the dangerous ground on this bank is well defined by Yin-tou-shih, as two of the rocks on it are 15 and 6 feet (4^{m}6 and 1^{m}8) high, respectively. At low water boats should pass about a cable southward of these rocks and then steer for the petroleum pier, or the buildings of the Petroleum Company, until Huang-chiao is open westward of Amoy island, bearing about 340°, when they can safely turn up the harbour.

At low tide boats approaching the Inner harbour from the anchorage between Kulangseu island and Sungseu peninsula should either go round, or pass close inside Nei-tu-wei buoy. When near high water, however, there is a passage between the rocks lying on the drying flat extending from the northern end of Kulangseu island; Ching pi in line with Chiong kun ta (chart 3449), bearing 241°, leads through this passage and close northward of a rock, which dries 12 feet (3^{m}7), lying about three-quarters of a cable northward of Yen-tzu-wei. Boats should continue on this mark until near Kuan-chai-chaio beacon, bearing in mind that a rock, which dries 5 feet (1^{m}5), lies nearly one cable westward of this beacon and almost on the leading line.

The most convenient landing place on the Kulangseu side of the Inner harbour is at a concrete jetty situated northward of the British Consulate; boats can proceed alongside this pier at any state of the tide.

Amoy city.—The Chinese city of Amoy, situated in the south-western part of Amoy island, ranks as a city of the third class and has a circumference of about 8 miles. The Chinese resident officials are the Admiral of Titu, the Colonel or Tsan Chiang, Intendent of Circuit or Tastai, and the Maritime Sub-prefect or Hai Fang Ting. Amoy and Kimoi islands are under the control of the Defence Commissioner for Amoy, and that part of the mainland opposite Amoy island is under the jurisdiction of the magistrate at Hai teng, situated about 2 miles south-eastward of Chioh be.

The foreign concessions lie along the eastern shore of the Inner harbour, where a considerable amount of land has been reclaimed and a sea wall constructed. Kulangseu island has become an International settlement, managing its own affairs under a municipal council elected annually, whose regulations and by-laws are subject

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Chart 1764.

to approval by the Chinese Government. Nearly all the Europeans reside on Kulangseu, but the mercantile establishment, where much of the business is transacted, are on the Amoy side of the harbour.

The Tongwen Institute (*Lat. 24° 27′ N., Long. 118° 04′ E.*), a white building of European design on the Amoy side of the Inner harbour, is conspicuous. Two wireless masts stand about a cable north-eastward of Fan-chiang-shih, and about 1¾ miles east-south-eastward of this stone is a conspicuous hangar, a grey building with a white roof.

Harbour facilities.—A moderate quantity of coal is usually kept in stock: fuel oil is obtainable.

Fresh provisions are usually plentiful. Water is supplied to vessels at anchor by water boat.

Repairs can be executed. There is a dry dock, belonging to the Chinese Government, situated on the eastern side of the northern entrance to the Inner harbour; *see* Appendix I.

Limited accommodation can be provided for urgent non-infectious cases in the Hope hospital, Kulangseu. In 1935 accommodation for about 35 infectious cases, including a limited number of foreign patients, could be provided at the Quarantine hospital in Amoy. The Chung Shan hospital also has accommodation for foreign patients.

Storm signals are displayed at the Customs signal station and at the signal station on the south-eastern side of Kulangseu island; *see* page 27.

A time signal is made from Kulangseu signal station.

There is frequent steamship communication with Hong Kong, Shanghai, Foochow, and Formosa, and there is direct communication with Manila. A railway betweeen Sungseu and Chang chiu has been nearly completed. The city is connected to the general telegraph system.

Trade and shipping—Rice, sugar, tinned vegetables, and tobacco are exported; the imports are petroleum products, cotton goods, motor car accessories, and artificial manure.

In 1935, 1,287 steam vessels, with an aggregate of 2,475,982 tons, entered Amoy harbour.

Charts 3449, 1767, 1760, 1968, 2412, 1262.

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CHAPTER III.

AMOY TO THE MIN KIANG, INCLUDING HAI TAN STRAIT.

Charts 1760, 1761.

COAST.—General remarks.—The coast between Amoy harbour and the southern entrance to Hai tan strait, about 100 miles north-eastward, is indented by several large bays, with numerous off-lying islands and dangers.

During the north-east monsoon there is usually a southerly or south-westerly sets off this coast, outside the limit of the influence of the tidal streams; in the south-west monsoon there is frequently, though not invariably, a set in the contrary direction.

Chart 1959.

South-east coast of Kimoi island.—Islets and dangers.—Matthews islet (*Lat. 24° 25′ N., Long. 118° 27′ E.*) lies about 1¼ miles east-north-eastward of Liau lu head (page 86) and a quarter of a mile offshore; a drying reef extends about 3½ cables southward from the islet.

Dodd head, the eastern extremity of Kimoi island and about 3 miles north-eastward of Liau lu head, is rocky and rises to a peak nearly half a mile inland. Dodd head is fringed by numerous islets, rocks, and reefs; the easternmost reef, which dries 8 feet (2m4), lies about half a mile offshore, and a detached reef, with a least depth of 2½ fathoms (4m6), lies about 4 cables south-south-eastward of the southern end of the head.

Dodd island and adjacent dangers.—Light.—Dodd island lies nearly 2 miles south-eastward of Dodd head and is surrounded by a reef which extends about a quarter of a mile north-eastward. A 2¼-fathom (4m1) patch, on which the sea breaks occasionally, lies about 1¼ miles eastward of the island. A reef which dries 7 feet (2m1) lies about half a mile west-north-westward of the island, and about 2 cables westward of this reef is a rock with a depth of 1¼ fathoms (2m3). A reef, with a least depth of 1¼ fathoms (2m3), lies about three-quarters of a mile northward of the island, and with any wind there are rollers on this reef.

A light is exhibited, at an elevation of 147 feet (44m8), from a white circular tower, 79 feet (24m1) in height, on the summit of Dodd island; the keepers' dwellings and outhouses are painted white. A fog signal is sounded from the lighthouse.

On several occasions Dodd island has been mistaken for Chapel island (page 84); it should, therefore, be noted that Dodd island lighthouse is white, and Chapel island lighthouse is black.

Dodd passage.—Directions.—Dodd passage, between Dodd

Charts 1968, 2412, 1262.

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Chart 1959.

head and Dodd island, has irregular depths of from 4¼ to 9 fathoms (7m8 to 16m5) between the reefs on either side.

Vessels proceeding north-eastward through Dodd passage should steer for the eastern extremity of Dodd head bearing 009°, taking care to be on that bearing before Liau lu head bears less than 280°. When Matthews islet bears 224° keep it astern on that bearing, which will lead through the passage in depths of from 6 to 9 fathoms (11m0 to 16m5), but passes only about 2 cables south-eastward of the 2½-fathom (4m6) patch lying south-south-eastward of Dodd head. Dodd passage requires caution, and it should not be attempted by sailing vessels, except with a fair wind.

During April the tidal streams in Dodd passage set north-eastward and south-westward.

Charts 1959, 1760.

Huitow bay.—Islets and dangers.—Huitow (Hu i tau) bay is entered between Dodd head and Huitow point, about 6½ miles north-eastward, and lies between Kimoi island and the mainland northward. Huitow point rises to Obelisk hill, on which is an obelisk, of a light colour and about 10 feet (3m0) high, having the appearance of a chimney; this obelisk, however, does not show up well. East peak and West peak, on the mainland about 13½ and 16 miles, respectively, north-westward of Huitow point, are good landmarks.

A ridge, with depths of about 3½ fathoms (6m4) on its outer end, extends half way across the bay from Wall point, situated about 2 miles northward of Dodd head. Reefs, on which the sea breaks heavily in bad weather, extend half a mile southward and westward from Huitow point; a rock with a depth of 2¾ fathoms (5m0), and possibly less depths in the vicinity, lies about 1¼ miles south-eastward of the point. A rock, with a depth of less than 6 feet (1m8) over it, on which the s.s. *Hang Sang* struck in 1933, was reported to lie about 7 cables south-eastward of Huitow point. Oyster islet, a low flat rock, lies about 2 miles north-north-westward of Huitow point; Oyster rock, awash, lies nearly one mile southward of Oyster islet.

Thalia bank lies with its outer end, on which is a depth of 1¾ fathoms (3m2), about 2¼ miles westward of Huitow point; thence the bank extends, with numerous rocks on it, in a north-westerly direction to the mainland at the head of the bay. White rocks lie on the bank about 3½ miles within its outer end, and Flak islet (*Lat. 24° 34′ N., Long. 118° 27′ E.*) lies about 2 miles north-westward of White rocks. There are deep channels on the north-eastern and south-western sides of the bank, respectively, but the south-western channel is much encumbered by reefs and requires local knowledge; the north-eastern channel terminates in a creek running in a northerly direction from the northern shore of the bay. A 4½-fathom (8m2) patch lies about 2 miles east-south-eastward of Flak islet and almost in the middle of the north-eastern channel.

Chart 1959.

Anchorages.—Directions.—During the north-east monsoon there is good anchorage about half a mile south-westward of Oyster islet, in a depth of 3¾ fathoms (6m4); also about three-quarters of a mile westward of this islet, in a depth of 5 fathoms (9m1), taking care to give a sufficient berth to the southern end of a rocky ledge about 6 cables west-north-westward of the islet.

Charts 1968, 2412, 1262.

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Chart 1959.

Anchorage may be obtained, in a depth of 5¼ fathoms (9^{m}6), with the summit of Flak islet bearing about 241°, distant 9 cables. To reach this anchorage the bay may be entered by steering for Oyster islet bearing 000°, and when the obelisk on Huitow point bears 090° alter course to 315°; when Oyster islet bears 090° steer 303° for the anchorage, which leads close northward of the 4½-fathom (8^{m}2) patch lying about 2 miles east-south-eastward of Flak islet. The tidal streams must be taken into consideration; the south-western side of the channel is steep-to, and sounding gives no warning.

Coast.—Dangers —The coast between Huitow point and Chimmo point, about 8½ miles north-eastward, is comparatively low, with sandhills rising to elevations of about 300 feet (91^{m}4); there are several small bays, but none of them affords shelter. There are two walled towns on the coast, and there is a small pagoda near the south-western, which lies about 3¼ miles north-eastward of Huitow point.

A reef, on which the sea breaks, lies about 3 cables eastward of the point near the south-western town; several other dangers and islets exist off this stretch, the positions of which can best be seen on the chart. This part of the coast should be given a wide berth.

Along the coast between Huitow and Chimmo bays the tidal streams set north-eastward and south-westward, but their duration and rate vary with the monsoons; the direction of the tidal steams is indicated by the numerous fishing nets moored off the coast.

Chimmo bay.—Islets and dangers.—Chimmo bay is entered between Chimmo point and Yungning point, about 2½ miles north-north-eastward; its shores are barren, and the walled town of Yungning is situated on the northern side of the entrance. The bay is unsafe during the south-west monsoon. Kusau hill, with a pagoda on its summit, situated on the northern side of the bay and nearly 4 miles north-north-westward of Yungning point, is conspicuous; close north-eastward of this hill, and separated from it by a deep gap or valley, is a hill of about the same elevation, with two peaks. *See* view facing page 102.

A spit, with a depth of 1½ fathoms (2^{m}7) on the outer end, extends about 1¼ miles north-north-eastward from Chimmo point, and Pagoda and Sour islets lie on this spit. Chimmo rocks are two rocks which dry, the southern of which lies about half a mile northward of Sour islet. A 3-fathom (5^{m}5) patch lies about 1½ miles north-westward of Sour islet, and a rock which dries lies about 3 cables westward of a flat islet, about 15 feet (4^{m}6) high, close off Yungning point. Shoulder peak, situated about 6½ miles north-westward of Yungning point, bearing 311°, leads into Chimmo bay between Chimmo rocks and Yungning point.

Coast.—Dangers.—Junk head lies about 1¼ miles north-eastward of Yungning point; Fairy rock, about 3 cables off the head, dries. The coast between Junk head and Chung chi point, about 6½ miles north-eastward, is indented by several small bays, affording shelter to junks, but rocks and reefs extend from their shores, and vessels should not attempt to enter them without local knowledge. Bell islet, with a bell-shaped pagoda on it, lies in one of these bays and about 2 miles south-south-westward of Chung chi point, but it is not conspicuous. Chung chi point is about 400 feet (121^{m}9) high, and sunken rocks extend about 3 cables south-eastward from it.

Charts 1968, 2412, 1262.

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Chart 1959

In 1922, the s.s. *Huichow* reported having struck an obstruction about 2 miles southward of Bell islet (*Lat. 24° 44′ N., Long. 118° 46′ E.*).

Chart 1760.

Chinchu harbour.—Light.—The entrance to Chinchu harbour lies between Chung chi point and a point about 10 miles north-eastward, on which the town of Tongbu is situated. There is little recent information about this harbour, and the details are mainly derived from the original survey in 1844. *See* views facing this page.

The harbour is greatly obstructed by islands, banks, and reefs, and should only be entered by vessels with local knowledge. A heavy swell rolls in when there is any wind, and the passage in is dangerous at low water to vessels of more than 10 feet (3m0) draught.

Choho point, on the southern side of the harbour and about 3¾ miles north-westward of Chung chi point, is 230 feet (70m1) high and has a pagoda on it. A sandbank extends about half a mile north-eastward and 1¼ miles east-south-eastward from Choho point; a reef, which dries, lies on the northern edge of this sandbank. Tahin rock, which dries, lies about 3 miles eastward of Choho point and on the edge of the coastal bank which extends from the southern side of the harbour between Chung chi point and Choho point; Hewen rocks, above water, lie between Tahin rock and Choho point.

Hewen rocks. *Choho pagoda, bearing about 272°.*
(*Original dated 1844*)

Seatoi island, about 2 miles northward of Chung chi point, is barren and rises to an elevation of about 40 feet (12m2) at its eastern end; Lynx rock, with a depth of one fathom (1m8) over it, lies about 3 cables east-south-eastward of the east point of Seatoi island. The channel leading into the harbour lies northward of Tahin rock and Hewen rocks, and southward of Lynx rock and Seatoi island; a reef, having three rocky heads which dry, lies nearly in mid-channel between Hewen rocks and Seatoi island.

Pisai islet lies about 1½ miles north-westward of Choho point, and about 4 cables eastward of this islet is Ota rock, which dries; a sandbank lies between the islet and the rock. Tatoi island lies about one mile northward of Seatoi island; Seatoi bank, with depths of from 2 to 3 fathoms (3m7 to 5m5) over it, extends about 2 miles south-eastward from Tatoi island, and there are frequently overfalls on it. Boot sand occupies a large portion of the harbour westward of Tatoi island.

Passage island, about 2¼ miles eastward of Tatoi island, has a scorched appearance. Several rocks lie within a distance of half a mile eastward of Passage island, and two of these dry; a ledge extends nearly 2 cables south-westward from Passage island, and a 3¼ fathom

Charts 1968, 2412, 1262.

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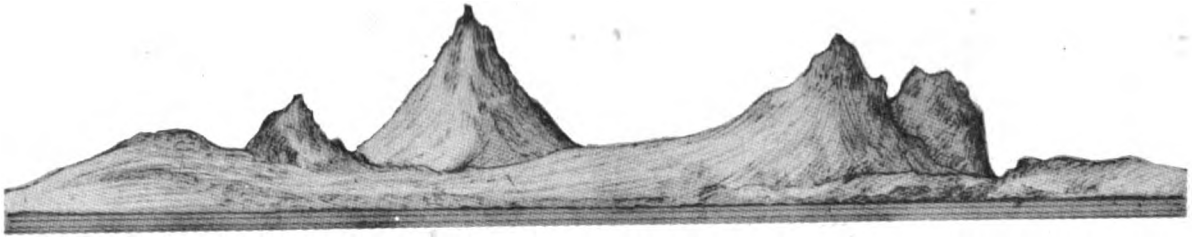
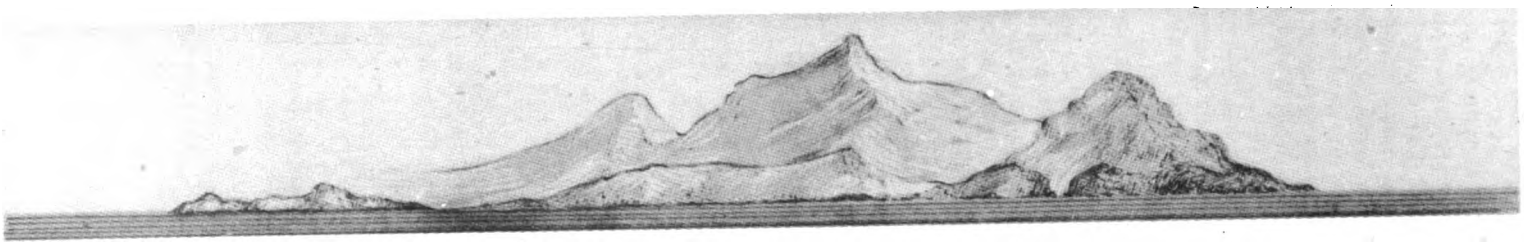


Kusau hill, from the north-eastward.

Chimmo bay.

(Original dated 1844).

Chung chi point. *Kusau pagoda.* *Choho pagoda.* *Pisai island.*



Seatoi island. *Tatoi island.*

Two views of Chinchu harbour.

(Originals dated 1844).

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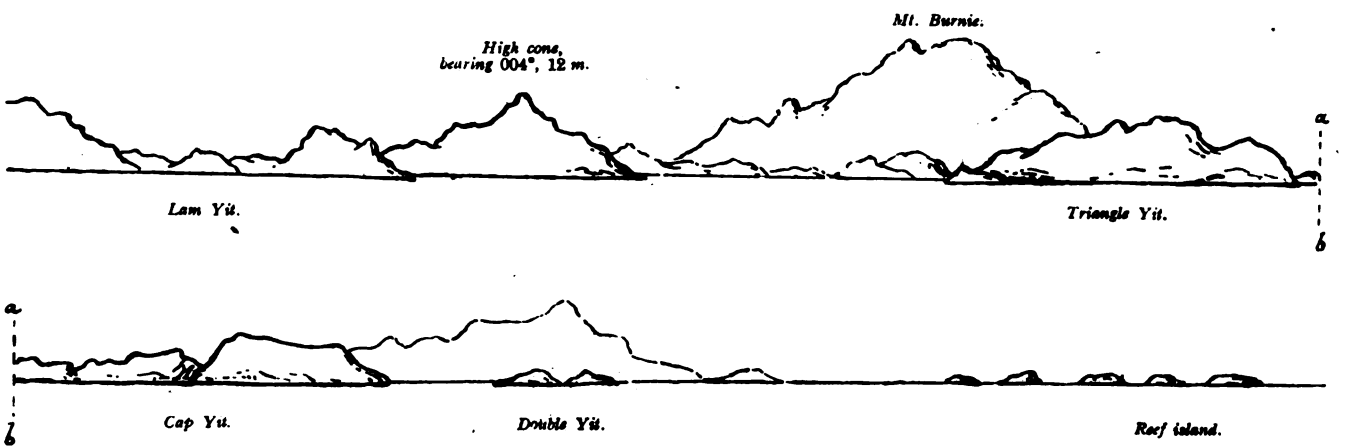
Ockseu islands from eastward

(Original dated 1935).



View, in two parts, of the approach to Singhwa wan.

(Original dated 1935).

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Chart 1760.

(5m9) patch lies about three-quarters of a mile south-south-westward of this island. White rocks lie about half a mile north-north-eastward of Passage island, with foul ground between, and are 20 feet (6m1) high. Tahkut island, about 1¼ miles northward of Passage island and half a mile off the northern shore of the harbour, has a large village on it, and there is a fort on its southern extremity.

A light is exhibited, at an elevation of 25 feet (7m6), from a white circular tower on a square base, situated on Wantau (Wintau) point, about 1¼ miles northward of Pisai islet.

About 3 miles north-westward of Pisai islet is the northern entrance point of a river; Chuanchow fu (Chinchu) is situated on the northern bank of this river and about 4 miles above the entrance. The channels leading to this city are shoal and intricate.

There is anchorage, for vessels with local knowledge, in a depth of about 7 fathoms (12m8), between Choho point and Boot sand; this anchorage is reached by the narrow channel between Hewen rocks and Seatoi island. In 1933 the depths in this vicinity were reported to be less than those charted. There is also anchorage northward of Boot sand, and there is smooth water here in any weather; this anchorage is approached by a channel about three-quarters of a mile northward of Tatoi island.

Charts 1760, 1761.

Tongbu bay.—Light.—Tongbu, a walled city, is situated on a point about 10 miles north-eastward of Chung chi point, and Tongbu bay lies immediately westward of this point; the bay affords good shelter in the north-east monsoon for vessels with local knowledge, in depths of from 4 to 7 fathoms (7m3 to 12m8), but it is not recommended on account of the rocks off its shores.

A light is exhibited, at an elevation of 120 feet (36m6), from a white circular tower on the south-west corner of Tongbu city wall.

Off-lying danger.—Juno rock, nearly 2 miles south-westward of Tongbu city, is a group of rocky heads with a least depth of 2 fathoms (3m7), and depths of from 5 to 6 fathoms (9m1 to 11m0) around.

Coast.—Anchorage.—Pyramid point (*Lat. 24° 53′ N., Long. 118° 59′ E.*), about 3 miles eastward of Tongbu, is 80 feet (24m4) high, and when seen from the eastward appears bold and black, but from northward or southward it is pyramidal. Pyramid rock, connected to the point by a drying reef, is about 60 feet (18m3) high and is surmounted by a conical building 20 feet (6m1) in height. Rocks above water and sunken rocks extend about 6 cables eastward and south-eastward from Pyramid point.

During the north-east monsoon small vessels with local knowledge can obtain anchorage in a small bay immediately westward of Pyramid rock; this anchorage is protected eastward by the reef extending south-eastward from Pyramid point, which forms a good breakwater. Rocks lie within a distance of about 3 cables around a point situated about 1¼ miles westward of Pyramid rock.

Port Matheson.—Port Matheson, entered between Pyramid point and Gulia point, about 4 miles north-north-eastward, affords good shelter to small vessels with local knowledge with offshore winds. A group of islets, with several rocks around, lies in the southern part of the bay, just within the entrance; the largest of these islets is about 120 feet (36m6) high. There is another group

Charts 1968, 2412, 1262.

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Charts 1760, 1761.

of islets just within the entrance on the northern side of the bay, the westernmost islet being about 70 feet (21m3) high. Owing to the number of rocks lying off the shores of the bay, and the possibility of the existence of uncharted dangers, caution should be exercised by vessels proceeding into the bay.

Sugarloaf hill, the highest hill on the northern side of the bay, is brown, conical, and conspicuous from eastward of Pyramid point, being the only hill of this shape in the vicinity.

Chart 1761.

Meichow wan.—Islets and dangers.—Meichow wan (Meichen sound) is entered between a point about 1½ miles north-eastward of Gulai point and Rogues point (*Lat. 25° 02′ N., Long. 119° 07′ E.*), about 6 miles north-eastward; Rogues point is the southern extremity of Meichow (Meichen) island. The sound runs in a north-north-westerly direction for about 18 miles, and has only been partially examined, so that many uncharted dangers may exist in it.

A reef extends about one cable south-eastward from Rogues point. A 5-fathom (9m1) patch lies about 1½ miles south-eastward of Rogues point, and a 4¾-fathom (8m7) patch lies about the same distance southward of the point. Meichow island is connected to the coast northward by a flat with general depths of less than 3 fathoms (5m5) over it.

Scout rock lies about 1¼ miles westward of Rogues point. A large reef lies about 2½ miles westward of Rogues point; on the southern end of this reef is Square rock, one of a group of rocks above water, and near the northern end is Ninepin rock. A group of flat rocks, which dry 17 feet (5m2), lies about 6 cables eastward of Ninepin rock, and a rock which dries lies about one mile north-north-eastward of the Ninepin.

Saddle island, about 3 miles north-westward of the Ninepin, is surrounded by rocks and islets except on its northern side; a pinnacle rock, with a depth of 6 feet (1m8) over it, lies about 1¼ miles south-westward of the island and about three-quarters of a mile north-eastward of a point on the south-western shore of the bay. Some rocks above water and a sunken rock lie about 1½ miles eastward of Saddle island.

Cliff islet lies about one mile north-north-eastward of Saddle island, and there is a rock awash about midway between. Shoal water extends for about a mile westward of Cliff islet, and a large sandbank lies north-westward of this islet; a rock, with a depth of less than 6 feet (1m8) over it, lies about 1¼ miles south-westward of the western extremity of Cliff islet. Mound peak is situated on the mainland and about one mile northward of Cliff islet; a walled town, with a pagoda near it, is situated close westward of Mound peak.

In the north-east monsoon good anchorage can be obtained by vessels with local knowledge between Rogues point and the flat rocks about 6 cables eastward of Ninepin rock, taking care to avoid Scout rock; there is also anchorage, in a depth of about 8 fathoms (14m6), with the Ninepin bearing 180°, and Rogues point bearing 126°.

In the south-west monsoon good anchorage can be obtained, by vessels with local knowledge, north-westward of Saddle island.

Coast.—Shot point is the north-eastern extremity of Meichow island; rocks above water and sunken rocks lie within a distance

Charts 1968, 2412, 1262.

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Chart 1761.

of one mile from it. Rowan islands lie close off a point on the mainland about one mile northward of Shot point.

Pinghai bay is entered between the Rowan islands and Ping point, about 6½ miles north-eastward. Ping rock, 90 feet (27m4) high and conical, lies about 4 cables southward of Ping point; a rock awash lies about a quarter of a mile south-westward of Ping rock, and two rocks, which dry one foot (0m3), lie about three-quarters of a cable and 1½ cables, respectively, west-north-westward of Ping point. The town of Pinghai is situated lose northward of Ping point. About 4 miles westward of Ping point is a high range of hills with a conspicuous peak named Marlin spike; the portion of the bay within this range is shoal. There is anchorage during the north-east monsoon, for vessels with local knowledge, in depths of from 3 to 5 fathoms (5m5 to 9m1), off Pinghai town, but the holding ground is not good, and with strong winds vessels often drag their anchors.

The coast between Ping point and Fort hill point, about 8 miles north-eastward, is fringed with rocks, and rocks and foul ground lie in the middle of the entrance to the bay between these two points, which has depths of less than 3 fathoms (5m5) in it.

Off-lying islands and dangers.—Lights.—Sorrel rock, about 3¾ miles eastward of Rogues point, is 60 feet (18m3) high; a detached rock lies nearly one cable southward of Sorrel rock, and a shoal extends about 4 cables north-eastward.

The north-western of the two Ockseu islands lies about 18 miles eastward of Rogues point, and has a round summit with smooth sides; there is a large fishing village on its south-western side. The south-eastern island has sandy hummocks, and there is a small fishing village on it; detached rocks lie off its southern side. *See* view facing page 103.

A light is exhibited, at an elevation of 286 feet (87m2), from a black circular tower, 64 feet (19m5) in height, situated on the summit of the north-western Ockseu island; the keeper's dwelling is white. A fog signal is sounded from the light-tower.

In clear weather, steam vessels proceeding against the north-east monsoon usually pass about 2½ miles north-westward of the north-western Ockseu island. Between the Ockseu islands and Turnabout island (page 121) the tidal streams set eastward and westward, with a maximum rate of 3 knots; the direction is, however, greatly influenced by the direction of the wind.

Loutz island lies about 5½ miles south-eastward of Ping point; in 1903 the s.s. *Ness* reported a rock awash about half a mile westward of this island, but its position is doubtful. In 1904, the s.s. *Titania* drawing 17 feet (5m2), reported grounding on a shoal about 1½ miles southward of Loutz island. Loutz shoal, consisting of two sunken rocks about a quarter of a mile apart, lies about 1½ miles west-north-westward of Loutz island. Loutz rock, with a peaked summit about 20 feet (6m1) high, lies about 1½ miles north-eastward of Loutz island; a rock, which uncovers at half tide, lies about 2 cables north-north-westward of Loutz rock, and a similar rock lies about 8 cables southward of Loutz rock. Caution must be exercised in this vicinity, as other dangers may exist.

SINGHWA WAN AND APPROACHES.—The entrance to

Charts 1968, 2412, 1262.

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Chart 1761.

Singhwa wan (Hunghwa sound), between Fort hill point and a point about 8½ miles north-eastward, is fronted by an archipelago known as the Eighteen Yits. The only serviceable channels for entering the sound are Lam Yit channel, along the western side of the archipelago, and Singhwa channel, along the north-eastern side. *See* view facing page 103.

Lam Yit.—Off-lying dangers.—Lam Yit, the largest island of the Eighteen Yits, lies with Lam point, its north-western extremity, about 4 miles south-eastward of Fort hill point. The south-eastern extremity of the island is a bold table-land, 530 feet (161m5) high; High cone, the highest peak on the island, rises on a peninsula forming the eastern extremity, and Low cone is situated in the north-western part of the island.

South Yit is an islet connected to the southern extremity of Lam Yit by a reef, which dries. A rock awash lies half a mile eastward of South Yit; a flat rock above water lies about 2 miles north-westward of South Yit and about a quarter of a mile off the south-west coast of Lam Yit, and about 4 cables southward of this rock is a rock awash. Duke reef lies about 2 miles west-north-westward of South Yit, and dries about 23 feet (7m0); if there is any sea it breaks on the reef at low water. A large sandbank, with its southern extremity about 2 miles westward of Duke reef, lies southward of the south-west point of Lam Yit; this sandbank is subject to change, but it is marked by discoloured water A 4½-fathom (8m2) patch lies about 2½ miles southward of the south-west point of Lam Yit.

Lam Yit channel.—Dangers.—Lam Yit channel, entered from southward between Loutz rock and the sandbank lying southward of the south-west point of Lam Yit, is bounded westward by the bank, with depths of less than 5 fathoms (9m1), extending from the mainland between Ping point and Fort hill point, and eastward by the western side of Lam Yit.

Clam islet lies on the western side of the northern entrance and about 2 miles north-westward of Lam point; Haystack, and several other rocks, lies close westward of the islet. A rock, with a depth of about 6 feet (1m8), lies about 1½ miles west-south-westward of Clam islet. A rocky patch, with a least depth of 1¾ fathoms (3m2), lies nearly 2 miles southward of Clam islet; in 1928, shoal water was reported to extend about half a mile southward of this patch.

Sheltered anchorage can be obtained by vessels with local knowledge southward of Lam point, and as close to the point as the vessel's draught will permit; owing to the bad holding ground, rock covered with mud, this anchorage is, however, unsafe with strong north-easterly winds. The outer rock off Lam point always shows, and this rock must not be brought to bear more than 339°, as the depths in the bay southward of Lam point decrease suddenly, and a sunken rock lies about 6 cables south-south-eastward of the point. Anchorage can also be obtained, in depths of from 4 to 5 fathoms (7m3 to 9m1), about 1½ miles northward of the point.

Vessels can proceed through Lam Yit channel on a northerly course, passing about one mile westward of Lam point, and the same distance eastward of Clam islet (*Lat. 25° 15′ N., Long. 119° 24′ E.*) and the islet about 1½ miles northward of it.

Charts 1968, 2412, 1262.

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Chart 1985.

Singhwa channel.—Islets and dangers.—The remainder of the Eighteen Yits, lying north-eastward and eastward of Lam Yit, are small islands covering a wide area encumbered by rocks, shoals, and reefs, too dangerous for navigation, whilst the tidal streams are strong and variable; they form the south-western side of Singhwa channel, and only those islands and dangers which lie near the channel are described here.

Triangle Yit lies about one mile south-eastward of the east point of Lam Yit; foul ground extends about one mile eastward from this islet. Fishing stakes may be found at times extending for a distance of about 4 miles south-eastward from a position about 2 miles east-south-eastward of Triangle Yit.

Cap Yit lies about 3 miles north-eastward of Triangle Yit; a rock, which dries, lies about 6 cables eastward of Cap Yit, with other rocks between. Scattered Yits, about 1¼ miles south-eastward of Cap Yit, consist of three rocks, the south-western being 3 feet (0m9) high; in 1937 a rock, which dries, was reported to lie about 1¼ cables southward of the latter rock.

Sedan rock, on the north-eastern side of the channel and about 6 miles east-north-eastward of Cap Yit, has a depth of 1¾ fathoms (3m2) over it and is steep-to. At Sedan rock, in March and April, the tidal streams set south-westward during the rising tide, and south-eastward during the falling tide, with a maximum rate of about 2½ knots. Reef island, on the north-eastern side of the channel, lies with its southern extremity about 2½ miles northward of Sedan rock, with Comet rock, having a depth of 6 feet (1m8), and Breaker rock, which dries 9 feet (2m7), between; there is foul ground for about 3 cables northward of Breaker rock. A reef, with above water and sunken rocks on it, extends about 7 cables northward of Reef island; at the northern end of this reef is Long reef, which has a rock 4 feet (1m2) high on it. Off the east point of Reef island, and connected to it by a reef, which dries, is an islet 101 feet (30m8) high; another islet, and some above water and sunken rocks, lie within half a mile south-eastward of Reef island. Bent islet lies about half a mile westward of Reef island, with shoals and drying reefs between; foul ground, with some rocks above water, extends about three-quarters of a mile south-westward from Bent islet. Sentry island, nearly 1½ miles south-westward of Bent islet, appears as two small islets when seen from south-eastward. A rock, with a depth of 3 fathoms (5m5) over it, lies about one mile westward of the south-western end of Sentry island. Sand island lies with its southern extremity about 2½ miles north-westward of Sentry island, and is of a whitish colour, with sandy beaches and isolated hills. Rocks extend about three-quarters of a mile from the south-eastern side of the island, and a large patch of foul ground, with some rocks above water, lies about midway between this island and Sentry island; a rock, with a depth of less than 6 feet (1m8), lies about 9 cables east-south-eastward of the south point of Sand island, and, in 1929, a wreck, with the masts and funnel above water, lay on this rock. Shoal water, with depths of less than 5 fathoms (9m1), extends fully 1½ miles westward from Sand island.

Double Yit, on the south-western side of the channel, consists of three islets, the south-western and highest of which lies about 1½

Charts 1761, 1968, 2412, 1262.

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Chart 1985.

miles north-eastward of Cap Yit ; a rock, with a depth of about 7 feet, (2m1), was reported, in 1909, to lie about 6 cables east-north-eastward of the south-eastern of these islets. Long Yit, an islet about 1¼ miles westward of Double Yit, is steep-to at its eastern end. Hong Kong rock, about three-quarters of a mile north-eastward of Long Yit, has depths of less than 6 feet (1m8) over it, and is not marked by discoloration. North-east Yit rock, about 1¾ miles north-westward of Long Yit, is about 10 feet (3m0) high, and shoal water extends about a cable north-westward from it. Little Yit rock lies nearly 1¼ miles westward of North-east Yit and is about 20 feet (6m1) high ; there are several patches, with depths of from 4½ to 5½ fathoms (8m2 to 10m1), between these two rocks.

Volga rock, with a least depth of 4 feet (1m2), lies about 3¾ miles north-eastward of Little Yit rock and on the northern side of Singhwa channel ; the tidal streams and ripplings are very strong near this rock. Douglas islet (*Lat. 25° 20′ N., Long. 119° 38′ E.*) lies about 6 cables northward of Volga rock and about the same distance southward of Vangan point, and is surrounded by a shoal, with depths of less than 3 fathoms (5m5), extending about 3 cables from its south-western side. Punchard islet, with an islet close south-westward of it, lies nearly one mile west-north-westward of Douglas islet and nearly 2 cables offshore. Kerr island, lies about 1¾ miles westward of Douglas islet and on the north-western part of a large reef ; South Kerr islet lies about 3 cables south-eastward of Kerr island. A reef, with a least depth of 3 fathoms (5m5), lies about 7 cables south-eastward of South Kerr islet, and a rock, which dries 8 feet (2m4), lies about 3¼ cables south-south-westward of this islet ; a shoal, with a least depth of 7 fathoms (12m8), lies nearly 1¼ miles southward of South Kerr islet.

Chart 818.

White islet, on the northern side of the channel and about 2 miles west-south-westward of Kerr island, is bare. Hung rocks lie about one mile southward of White islet ; on the eastern part is a rock which dries 8 feet (2m4), and on the western part is a rock which dries 4 feet (1m2). The summit of Chim island (page 111) in line with South Kerr islet (chart 1985), bearing 068°, leads northward of Hung rocks, and Cliff islet (page 110) bearing 266°, and open northward of Red Yit, leads southward of these rocks.

Red Yit (chart 1985), an island rising to an elevation of 324 feet (98m8) in the northern part, lies on the southern side of the channel with its northern extremity about 3 miles south-westward of White islet ; the area southward of the line joining the north point of Red Yit and Little Yit rock is foul. North Yit rocks lie about three-quarters of a mile north-westward of the north point of Red Yit ; a rock in the western part dries 13 feet (4m0), and two rocks in the eastern part dry 2 feet (0m6) and 4 feet (1m2), respectively.

Passage islands, three in number, with numerous above water and sunken rocks, lie north-westward of Red Yit ; Gough islet, the northernmost of the group, lies nearly 4 miles westward of White islet, and is conical, cliffy, and steep-to on its northern side. A rock, one foot (0m3) high, lies about three-quarters of a mile south-eastward of Gough islet ; a shoal, with depths of less than 5 fathoms (9m1), extends about half a mile eastward and about 4 cables westward from this

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Chart 818.

rock. A reef, which dries 13 feet (4m0) at its outer end, extends about 2 cables westward of the western Passage island. Douglas rock and the other dangers southward of the Passage islands are described on page 110.

Wilshere island lies nearly 6 cables north-westward of Gough islet; a rock, 3 feet (0m9) high, lies about one cable southward of the island, and about one cable north-westward of this rock is a rock which dries 13 feet (4m0). A rock, which dries 12 feet (3m7), lies about 2 cables north-eastward of the north-east point of Wilshere island.

Rugged island lies about 4 cables northward of Wilshere island. Griffith island lies about 4 cables off the north-west coast of Rugged island; a rock, with a depth of less than 6 feet (1m8), lies about 4 cables west-north-westward of the south-west point of Rugged island.

Charts 818, 1985.

Anchorages.—During the north-east monsoon there is good anchorage about midway between Kerr island and Douglas islet, in a depth of 5 fathoms (9m1), with Punchard islet bearing 351°, distant 6 cables, but the bottom is very uneven in this locality.

Anchorage may be obtained about 2 cables westward of Wilshere island, in a depth of 12 fathoms (21m9), mud, out of the strength of the tidal streams. In 1936 H.M.S. *Dorsetshire* anchored with the western extremity of Wilshere island bearing 081°, distant 7 cables, in a depth of 14 fathoms (25m6); the bottom here is, however, uneven, and the tidal streams are strong.

Tidal streams.—A portion of the north-westerly tidal stream, entering the south-east entrance to Hai tan strait (page 112) during the rising tide, turns south-westward round Chim island (page 111); this portion divides southward of Volga rock, one part flowing southward, and the other part flowing through the numerous passages between Rugged island and Lam Yit to Lam Yit channel.

The west-going stream in the channels between Rugged island and Red Yit may attain a rate of from 5 to 7 knots at spring tides, setting fairly through the passages; there are frequently heavy overfalls and eddies. In March, an eddy has been experienced between Red Yit and North Yit rocks, setting north-eastward and south-westward, with a maximum rate of from 2 to 3 knots.

Directions.—Vessels can enter Singhwa channel from the eastward by passing between Sedan rock and Comet rock, or between Sedan rock (*Lat. 20° 15′ N., Long. 119° 45′ E.*) and Scattered Yits; thence pass between Sentry island and the rock reported to lie about 6 cables east-north-eastward of Double Yit, taking care to avoid the 3-fathom (5m5) rock lying about one mile westward of Sentry island. The route then lies between Hong Kong rock, North-east Yit rock and Little Yit rock, on the southern side, and Volga rock and South Kerr islet, with the adjacent dangers, on the northern side; White islet kept midway between Wilshere and Rugged islands, bearing 280°, leads clear southward of all the dangers lying near South Kerr islet. Vessels can pass either side of White islet, and thence between Gough islet and the 3-foot (0m9) high rock off the southern side of Wilshere island, taking care to give this rock a good berth.

Charts 818, 1761.

Vessels proceeding from Lam Yit channel into Singhwa channel, after passing one mile eastward of Clam islet and the islet about

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Charts 818, 1761.

1½ miles northward of it (page 106), should steer for the western end of Rugged island; when Gough islet bears 090° an easterly course can be steered to pass between this islet and the 3-foot (0m9) high rock southward of Wilshere island.

Chart 818.

Inner passage between Lam Yit and Singhwa channels.—The ordinary routes taken by vessels proceeding through either Lam Yit channel or Singhwa channel unite at the entrance to Singhwa wan; these two channels are also connected by a channel leading southward of the Passage islands. Owing to the numerous dangers in this channel, and the lack of leading marks to avoid them, it must only be used in cases of emergency by small vessels.

Cliff islet, about 1½ miles south-south-westward of the western Passage island, is precipitous. A bank, with general depths of from 3½ to 5 fathoms (6m4 to 9m1), lies with its eastern edge about 3 cables westward of Cliff islet; on the south-western edge of this bank and about 8½ cables westward of the islet, there is a depth of only 2½ fathoms (4m6). A reef, which dries in two places near its outer end, extends about 3 cables south-eastward from Cliff islet, and a reef, part of which dries, lies within half a mile north-eastward of the islet.

Douglas rock, a small pinnacle with a depth of 4 feet (1m2), lies about 6½ cables south-south-eastward of the eastern Passage island; a 2-fathom (3m7) patch lies about one cable south-eastward of Douglas rock, and a rock, with a depth of less than 6 feet (1m8), lies nearly 2 cables southward of the rock. These three heads lie on a rocky shoal, with depths of from 2½ to 5 fathoms (5m0 to 9m1), which extends about 4 cables southward and south-westward from Douglas rock; three 4-fathom (7m3) patches lie close off the western and north-western sides of this shoal.

A reef, part of which dries 13 feet (4m0), lies nearly half a mile southward of Douglas rock.

Vessels proceeding through this channel from the westward should pass about 1½ cables westward of Cliff islet by keeping the summit of Griffith island in line with the south-west point of Ragged island, bearing 358°. Continue thus until the north-western side of Gough islet is in line with the south-eastern side of the western Passage island, bearing 036°, when steer for them on this bearing; when the western sides of Wilshere island and the western Passage island are in line, bearing 007°, steer eastward to pass midway between Douglas rock and the one-foot (0m3) high rock lying about 3½ cables north-north-eastward.

Chart 1761.

Singhwa wan.—Singhwa wan (Hunghwa sound) contains many islets and dangers, and it has not been thoroughly examined; the Hunghwa river, with Hinghwafu situated near its mouth, flows into the western part. Knob islet, with some rocks, northward and north-westward of it, lies about 4½ miles northward of Clam islet (page 106)

Pitiu point is the southern extremity of a peninsula extending from the northern shore of the sound.

Singhwa wan affords anchorage in a typhoon. There is good anchorage, for vessels with local knowledge, in a depth of 5 fathoms

Charts 1968, 2412, 1262.

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Chart 1761.

(9m1), with Pitiu point bearing 066°; this anchorage can be approached by steering north-westward for Pitiu point from a position about 1¼ miles eastward of Knob islet, passing north-eastward of the rocks lying north-westward of that islet. A rock, on which the s.s. *Ichang* struck in 1931, is reported to lie about three-quarters of a mile southward of Pitiu point.

Chart 1985.

HAI TAN STRAIT.—Chu shan (Hai tan island) is separated from the main coast between Vangan point and Rodd head (*Lat. 25° 42′ N., Long. 119° 36′ E.*), about 21 miles northward, by Hai tan strait; although this strait is nearly 1¼ miles wide at its narrowest part, it is much encumbered by islets, rocks, and shoals, leaving only narrow passages between. The southern entrance affords anchorage in a typhoon.

Steam vessels exceeding 22 feet (6m7) in draught should not use Hai tan strait, as should any unforeseen delay occur to prevent them taking advantage of the rise of the tide, they would probably ground. In Wilson channel, on the western side of the middle part of the strait, the bottom is sandy, the tidal streams are strong, and small knolls are liable to form and shift; a vessel should, therefore, have about 6 feet (1m8) clearance under her.

Two entrances give access to the strait from southward, namely South entrance and South-east entrance; they are separated from each other by Sand and Chim islands.

South entrance.—The approach to South entrance lies between Double Yit and Sentry island; farther northward this entrance is bounded westward by Volga rock, Douglas islet, and the coast of the mainland northward of Vangan point, and eastward by the shoals extending westward from Sand and Chim islands. Most of these islands and dangers have already been described with the eastern part of Singhwa channel, on page 108. *See* view B on chart 1985.

Nopass, a rock 15 feet (4m6) high, lies on the western side of the entrance and about 6 cables eastward of Vangan point; the channel between this rock and the mainland should not be used. Nearly 2 miles north-eastward of Vangan point is a point, 116 feet (35m4) high, with a pagoda on it; Vangan, a walled village, lies close southward of this point. Between this point and a point about one mile northward is an inlet, almost entirely filled by a shoal flat; an island, the east point of which is steep-to, lies in the entrance to this inlet. Hive island lies about 6 cables north-north-eastward of the northern entrance point of the inlet; rocks extend about 3 cables southward from this island, and a rock, 60 feet (18m3) high, lies about one cable northward of the northern side of the island.

Round islet and Knob islet, on the eastern side of the entrance, lie on the northern part of the bank extending westward from Sand island; a rock 8 feet (2m4) high, with some sunken rocks around, lies about 3 cables south-westward of Round islet. Chim island, close northward of Sand island, is the highest island in this locality, and gradually rises on all sides to two peaks, on the higher of which three chimneys are shown on the chart, but in 1937 it was reported that these could not be identified. There are five islets, including Knob islet, in the channel between Sand island and Chim island; the

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Chart 1985.

easternmost islet, which is 174 feet (53m0) high, is connected to the south coast of Chim island by a ridge of rocks, and a reef, which dries about 18 feet (5m5), lies about a quarter of a mile north-eastward of this islet.

South-east entrance.—Dangers.—Reef island, with the dangers southward of it, has been described on page 107. Rocks above water and sunken rocks extend about 7 cables northward from this island, and at the northern end is Long reef, 4 feet (1m2) high. Chim rock, 42 feet (12m8) high, lies nearly 1¼ miles northward of Long reef. North Chim rock, 18 feet (5m5) high, lies about three-quarters of a mile northward of Chim rock; a rock lies about one cable north-eastward of North Chim rock.

South reef, on the northern side of South-east entrance and about 4 miles north-eastward of North Chim rock, dries 13 feet (4m0), and the sea breaks heavily on it. Trite island, about 2½ miles northward of South reef, has three peaks; some islets and rocks lie within a distance of 3 cables off its north-western side. A shoal, with a depth of 2½ fathoms (4m6) or less, was reported by the s.s. *Peiyang*, in 1905, to lie about one mile south-eastward of Trite island.

Hai tan point, about 3 miles northward of North Chim rock, is the south-east point of a rugged, sandy headland forming the southern extremity of Chu shan. The south-west coast of Chu shan, which forms the north-eastern side of South-east entrance, is fringed by a wide bank on which are several above water and sunken rocks; one of these, named Square rock (*Lat. 25° 24′ N., Long. 119° 44′ E.*), lies about 1½ miles westward of Hai tan point and is 18 feet (5m5) high. *See* view A on chart 1985.

Chart 817.

Narrows of Hai tan strait.—Islets and dangers.—Northward of Chim island, at the junction of South and South-east entrances, the two sides of the strait converge rapidly, so that the narrowest part of the strait commences about 2½ miles northward of Hive island. Mount Burnie, situated on the western side of the strait and about 2½ miles north-westward of Hive island, is conspicuous. Tyne yung shan, about 2½ miles northward of Mount Burnie, is a remarkable steep hill; Quoin hill, about 6 cables eastward of Tyne yung shan, appears wedge-shaped when seen from northward or southward. *See* view A on chart 1985.

Northward of Hive island depths of 3 fathoms (5m5) and under extend fully 1½ miles off the western shore of the strait. Ko-mor is an island lying close off the western side of the strait, with its south point about half a mile northward of Hive island; Young island lies about 3 cables eastward of Ko-mor, and close eastward of Young island is an islet 30 feet (9m1) high.

Station island, on the eastern side of the strait and about 2 miles north-westward of Square rock, is often difficult to identify until close to, but about three-quarters of a mile northward of it, on the coast of Chu shan, there is a conspicuous white triangular patch of sand. Owing to its sloping sides, and the great rise and fall of the tide, Station island appears nearly twice the size at low water to what it does at high water. A reef, which dries 20 feet (6m1), lies about 2 cables southward of Station island. Edmond reef lies about 4 cables north-westward of this island, and dries 15 feet (4m6). A

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Chart 817.

sand spit, which dries, extends about 1¼ miles in a north-westerly direction from the coast eastward of Edmond reef. Junksail islet lies nearly 1¾ miles north-westward of Station island; Junksail, a rock 39 feet (11m9) high, lies close off the south-eastern side of this islet. Junksail islet lies on the southern side of the southern entrance to a large inlet, which is, however, entirely occupied by shoal flats and several islands; the portion of this inlet northward of Abbott island, which lies with its south point nearly 1¼ miles northward of Junksail islet, is named Dyantau bay. Low islet lies about 3 cables westward of Abbott island, and a rocky ledge extends 1½ cables southward from it. There are depths of 3 fathoms (5m5) and under on the eastern side of the narrows a short distance outside the line joining the western sides of Junksail and Low islets.

Pass island, on the western side of the fairway of the strait, lies with its north point about 6¼ cables south-westward of Low islet; another island lies close off the north-western side of Pass island, and the two are joined together by a narrow ridge of boulders and gravel. Both islands lie on a sandbank, a part of which dries 3 feet (0m9). Pass rocks lie about 2 cables eastward of the northern end of Pass island and dry 20 feet (6m1); there is a deep channel between these rocks and Pass island, but it is not recommended. Ashuelot rocks, about 3 cables northward of Pass rocks and 2 cables westward of Low islet, are three rocks with depths of 4 feet (1m2), 1¼ fathoms (2m7), and 3¼ fathoms (5m9) over them, respectively; there are depths of 6 fathoms (11m0) close around the rocks, and at low water they are plainly marked by overfalls. The west point of Station island in line with the north-east point of Junksail islet, bearing 136°, leads between Pass rocks and Ashuelot rocks; *see* view A on chart 817.

Beacons.—There are two pyramidal concrete beacons on the eastern side of Pass island; the front beacon is white and the rear beacon is black, and in line they bear 159°.

An iron tripod beacon, surmounted by a sphere 6 feet (1m8) in diameter, the whole painted black, stands near the northern extremity of Pass rocks; the total height of the structure is 26 feet (7m9), and at least 12 feet (3m7) of it is above high water.

Anchorages.—There is good anchorage, in a depth of 4 fathoms (7m3), sand, with Station island bearing 072°, and the western side of Junksail islet (*Lat. 25° 26′ N., Long. 119° 41′ E.*) bearing 328°.

Anchorage can be obtained off Maiangkun bay, on the eastern side of the northern part of the narrows, in a depth of 6 fathoms (11m0), mud and sand, with the western sides of Junksail islet and Low islet in line, bearing 155°, and 6 cables from the latter.

Wilson and Blind channels.—Wilson channel, on the western side of the middle part of Hai tan strait, although narrow, is undoubtedly the best route; greater depths can be obtained by using it, and there are reliable leading marks for the fairway. Blind channel, eastward of Wilson channel, is wider and deeper, but a vessel using it is obliged to cross a bar, with a depth of only 2¼ fathoms (4m1), at the northern end. For convenience, the islands and dangers in or near both channels are described together, as the former afford good marks for vessels using either channel.

Flag island, the dividing point between the southern entrance of

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Chart 817.

Wilson channel and Blind channel, lies about 1¾ miles northward of Pass island; reefs extend about 3½ cables southward and 1½ cables northward from the island, and a rock, 12 feet (3m7) high, lies close northward of the island. The eastern and western sides can be safely passed at a distance of one cable.

Channel rock, about three-quarters of a mile north-north-eastward of Flag island, is 10 feet (3m0) high; shoal water extends nearly a cable northward from it. Two groups of rocks, separated by a narrow channel with a depth of 7 fathoms (12m8), lie about 4 cables north-north-westward of Channel rock; amongst the western group is a rock which dries 8 feet (2m4), and amongst the eastern is a rock which dries 4 feet (1m2). Hill island lies about 3 cables north-eastward of Channel rock and close off the west coast of Chu shan. Middle island lies about 5½ cables northward of Hill island; a rock, 7 feet (2m1) high, lies nearly 1½ cables northward of the east point of Middle island. Saxby islets are a group of islets and rocks, the largest of which, 15 feet (4m6) high, lies about 9 cables eastward of Middle island. Town point, about half a mile eastward of the largest Saxby islet, is the southern entrance point of a channel leading to Haitang (Hai tan chin) (chart 1985), a town near the east coast of Chu shan; on the northern side of this channel, and about 2 miles eastward of Town point, is a sandhill 171 feet (52m1) high.

Rocky islands, four in number, with numerous rocks around them, lie on the western side of Wilson channel, the northern and largest, 33 feet (10m1) high, being about 2¾ miles north-westward of Flag island. Charles island lies nearly three-quarters of a mile northward of the northern Rocky island, and there is a large boulder on its summit. Black rocks, the highest of which is 20 feet (6m1) high, lie about 3½ cables eastward of Charles island; there are depths of over 3 fathoms (5m5) on the western side of Wilson channel about a cable eastward of these rocks. A sandbank, which dries in patches, extends about 1½ miles from the coast northward of Charles island; several islets and rocks lie on the northern part of this sandbank, the principal being Round island, about 2¾ miles north-north-westward of Charles island, and St. Hilaire islets, about 3½ cables eastward of Round island.

Tricker rock, about 3 miles north-eastward of Charles island, dries 20 feet (6m1); some rocks lie close off the south-eastern side of Tricker rock, and a 2-fathom (3m7) patch lies about 1¾ cables south-south-eastward of it. Pillar rock, 90 feet (27m4) high, lies about one mile north-north-eastward of Tricker rock; close westward of Pillar rock is an islet 40 feet (12m2) high.

Tower rock, about 2¾ miles north-westward of Pillar rock, is 28 feet (8m5) high and flat, with a deep embrasure; a smaller rock lies about one cable westward of it.

Beacons.—A white stone cairn stands on the 7-foot (2m1) high rock close northward of Middle island; a similar beacon stands on the largest Saxby islet. These two beacons in line, bearing 084°, indicate the position where vessels, bound northward through Wilson channel, leave the leading line of Pass island beacons.

Chart 1985.

North entrance.—Islands and dangers.—Chung, Slut, Shingan, Dori, and Tatong islands lie across the northern entrance of Hai tan

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Chart 1985.

strait, as well as numerous rocks and shoals; although there are deep channels between some of these, only one is in general use, namely, that between Slut and Shingan islands.

Tatong island lies about half a mile off the north-west coast of Chu shan, and its summit, a peak 750 feet (228m6) high, is in the south-eastern part. The channel between these two islands is deep, but Button (*Lat. 25° 38′ N., Long. 119° 42′ E.*), an islet 40 feet (12m2) high, lies in about the middle, and a reef awash lies about half a mile south-westward of Button; Long island, with several reefs around, lies in the northern entrance. A bank, with depths of less than 2 fathoms (3m7), extends about 1¼ miles south-westward from the south-western part of Tatong island; Inner rock, near the outer end of this bank and fully one mile north-eastward of Tower rock, is 30 feet (9m1) high. Three rocks, about half a mile westward of Inner rock, are from 2 to 6 feet (0m6 to 1m8) high.

Dori island is separated from the north-west coast of Tatong island by a channel about 3 cables wide, but it should not be used for navigation; a rock, which dries 16 feet (4m9), lies in the southern part of this channel. There are irregular depths, with patches of foul ground, up to a distance of about 1½ miles south-south-westward of Dori island, and a rock, which dries 2 feet (0m6), lies nearly one mile south-south-westward of the south-west point of this island. About half a mile west-south-westward of the south-west point of Dori island is a large patch of rocky and foul ground, with some rocks on it which dry 8 feet (2m4).

Shingan island is separated from the north-west coast of Dori island by a channel about 3 cables wide, in which there are irregular depths of from 2½ to 14 fathoms (4m1 to 25m6). Shing rock, 90 feet (27m4) high, lies about 6 cables north-eastward of Shingan island and is connected to it by a rocky reef; a rock, with a depth of less than 6 feet (1m8), lies about half a mile north-eastward of Shing rock, and there is a 3-fathom (5m5) patch between. Simpson spit extends about 2 miles northward from the northern side of Shingan island and across the main entrance leading into Hai tan strait from the northward; there are general depths of from 3¾ to 4 fathoms (6m9 to 7m3) over this spit, but a 2½-fathom (4m6) patch lies about 7 cables north-westward of the north-east point of Shing rock. Shoal water extends about 2 cables from the western side of Shingan island.

Slut island lies about half a mile westward of Shingan island; the summit of Slut island, when seen from the southward, is a boulder, painted white with a black vertical stripe, and there is a light-coloured patch on the western shoulder of the island. A bank, with a depth of 3 feet (0m9) at the outer end, extends about 6 cables southward from Slut island; a rock, with a depth of 6 feet (1m8) over it, lies on the western edge of this bank and about 2 cables southward of the south-west point of Slut island. Mitre rock, about three-quarters of a mile southward of Slut island, is 20 feet (6m1) high. A spit, with general depths of from 3½ to 5 fathoms (5m9 to 9m1), extends about 1½ miles north-north-eastward from Slut island, but a 2-fathom (3m7) patch lies on this spit about 4 cables north-north-eastward of the east point of this island. An islet lies about 1½ miles northward of Slut island, and within a distance of 1½ miles north-north-eastward of this islet are two drying reefs.

Charts 1761, 1968, 2412, 1262.

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Chart 1985

Cow's horn is a remarkable peak on the mainland, situated near the coast about 3¼ miles northward of Rodd head, which lies about 1¾ miles north-westward of Slut island; *see* view facing page 128.

Beacons.—On the south-eastern slope of Slut island are two white pyramidal concrete structures, 1¼ cables apart. These beacons, the painted boulder on the summit of Slut island, and Cow's horn are in line bearing 351°; the two beacons in line lead between Mitre rock and the dangers south-eastward of it.

Off-lying islands and dangers.—Tessara islands consist of one island, 221 feet (67m4) high, lying about 5½ miles north-eastward of Rodd head, and several islets and reefs around it. Fairway islet lies about 9 cables south-westward of the main island of Tessara group and about one mile eastward of Cow's Horn point; there are depths of about 7 fathoms (12m8) in the channel between the point and the islet. There are depths of less than 5 fathoms (9m1) for about 4 cables southward of Fairway islet, and a 1¾-fathom (3m2) patch lies about 1¼ miles southward of the islet. A reef, which dries, lies nearly 3 cables south-eastward of Fairway islet. Two rocks, which dry, lie about 3 cables off the west coast of the main island. A reef extends about one mile eastward from this island, and an islet, 95 feet (29m0) high, lies on the north-eastern part of this reef. Great Dragon islet lies about 6 cables north-eastward of the main island, and is almost connected to it by reefs. Brown rock, 90 feet (27m4) high and cleft in two, lies about 1¼ miles westward of Great Dragon islet; about 4 cables farther westward is Namoa rock, with a depth of 4 feet (1m2) over it.

Red rock, 30 feet (9m1) high, and surrounded by foul ground within a distance of half a mile, lies about 3 miles north-eastward of Shing rock. There is a line of islets and shoals between Red rock and the north-west point of Tatong island.

Waif rock, about 2½ miles eastward of Red rock, is 48 feet (14m6) high; its northern side is steep-to, but rocks lie off its other sides. A reef, which dries about 24 feet (7m3), lies about 7 cables south-south-westward of Waif rock.

Norton rock (*Lat. 25° 46′ N., Long. 119° 48′ E.*), about 3¼ miles north-eastward of Waif rock, is 52 feet (15m8) high; a rock, with a depth of less than 6 feet (1m8), lies about one cable north-westward of Norton rock, and a 6-fathom (11m0) patch lies about half a mile further north-westward.

Bassett rock, about 4 miles south-eastward of Norton rock, is a pinnacle with a depth of 3 fathoms (5m5) over it.

Warning rocks consist of two rocky islets and several rocks above and below water; the northern islet lies about 1¼ miles south-westward of Bassett rock and is 107 feet (32m6) high. A rocky reef, part of which dries 3 feet (0m9), lies about half a mile south-westward of the southernmost of the Warning rocks. Owing to the numerous reefs, vessels should avoid the area lying southward of the lines joining Red rock, Waif rock, and the northern Warning rock.

Directions for Hai tan strait.—To enter Hai tan strait by the South entrance, pass between Scattered Yits and Sedan rock, and thence between the rock reported about 6 cables eastward of Double Yit and the 3-fathom (5m5) rock lying about one mile westward of Sentry island; a north-north-westerly course may be steered for

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Chart 1985.

Nopass, when the rock is visible, and when the southern extremity of Sand island bears 112° the triangular patch of sand on the south-west coast of Chu shan (view B on chart 1985) may be steered for bearing 027° until Junksail islet bears 353°. An alternative route when approaching from the southward is to pass about 2 cables westward of Triangle Yit, about 3 cables westward of Cap Yit and Double Yit, and thence steering for Nopass as previously directed. Vessels approaching the South entrance from the westward, through Singhwa channel, can pass either side of White island and then keep Wilshere island (chart 818) just open southward of that island, bearing 280° astern, until the sand patch on Chu shan bears 027°, when steer for it as directed above.

To enter the strait by the South-east entrance, from the south-eastward, pass about one mile north-eastward of North Chim rock, and thence steer west-north-westward, so as to pass about 3 cables northward of Chim island, until Junksail islet bears 353°. Vessels approaching from the northward, after rounding Hai head (page 119), should pass about 3 cables south-eastward of Trite island, taking care to avoid the shoal about one mile south-eastward of that island, and thence about one mile southward of Haitan point, when a westerly course may be steered until Junksail islet bears 353°.

Chart 817.

After passing through either entrance steer for Junksail islet bearing 353° until the islet close eastward of Young island bears 270°, when a north-north-westerly course may be steered to pass about 4 cables westward of Junksail islet; thence steer to pass about 2 cables eastward of the beacon on Pass rocks. When the western side of Station island is in line with the eastern side of Junksail islet, bearing 136° (view A on chart 817), keep this mark on astern until Tyne yung shan is in line with Quoin hill, bearing 261°, and the beacons on Pass island are also in line, bearing 159°; vessels proceeding northward through the strait with the south-going tidal stream must take care to avoid being set on to Pass rocks. Keep Pass island beacons in line astern, and whilst on this alignment Round island will be seen right ahead, about midway between Charles island and Black rocks, bearing about 337° (view B on chart 817). When the beacon on the largest Saxby islet is in line with the beacon on the 7-foot (2^m1) high rock close northward of Middle island, bearing 084°, course must be altered to pass about 3 cables eastward of Black rocks; a useful mark for this purpose is to keep the western side of Shingan island in line with the rock close westward of Tower rock, bearing 359°. Care must, however, be taken not to be eastward of this alignment, as a narrow spit, with a depth of $1\frac{1}{2}$ fathoms (2^m7) on its western extremity, extends across the fairway from the eastern side of the channel; the western extremity of this spit lies about $1\frac{1}{2}$ miles westward of the beacon on the 7-foot (2^m1) high rock.

Chart 1985.

Continue on the last mark until Talisman peak, situated about $2\frac{3}{4}$ miles north-westward of Black rocks, bears 270°, when keep Cow's horn in line with the western shoulder of Slut island, bearing 352° (view C on chart 1985); the shoulder of Slut island being flat, it does not form a very definite mark, so that the bearing of Cow's horn should be carefully kept. When Inner rock (*Lat. 25°, 38′ N., Long.*

Charts 1761, 1968, 2412, 1262.

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Chart 1985.

119° 39 E.) bears 089°, bring Cow's horn, the summit of Slut island, and the beacon on that island in line, bearing 351°, which leads between Mitre rock and the dangers south-eastward. When Mitre rock bears 270° a north-north-westerly course may be steered to pass midway between Slut and Shingan islands; then bring Mitre rock midway between these two islands, and in line with a dip in the hills behind, bearing 217° astern (view D on chart 1985), which leads over Simpson spit in a least depth of 4¼ fathoms (8m2), but as it passes between the 2¼-fathom (4m6) and 3¾-fathom (6m9) patches, this leading mark must be carefully maintained When the north-eastern extremity of Shing rock bears 157° vessels will have passed over this spit, and course may be shaped to pass south-eastward of the Tessara islands.

Chart 817.

Vessels passing through Blind channel, in preference to Wilson channel, should pass between Pass rocks and Ashuelot rocks as previously directed. When Low islet bears 078°, alter course northward and steer to pass 2¼ cables eastward of Flag island, and from this position steer north-north-westward so as to bring the western side of Pass island in line with the eastern side of Flag island, bearing 170°, Keep this mark on astern until the beacon on the largest Saxby islet is in line with the beacon on the 7-foot (2m1) high rock off Middle island, bearing 084° (the 171-foot (52m1) high sandhill about 2¼ miles eastward of Tower point will also be in line with the beacons), when edge eastward so as to bring the western side of the islet close westward of Pass island in line with the eastern side of Flag island, bearing 174°, and keep this mark on astern until Pillar rock is in line with Tricker rock, bearing 034°; Tricker rock may not be sufficiently above water to be seen, and another mark is the pagoda about 1¼ miles south-westward of Charles island in line with that island, bearing 244°. From this position steer a north-westerly course across the Middle ground, in a least depth of about 2¼ fathoms (4m1), and bring Cow's horn in line with the left shoulder of Slut island, thence proceeding as previously directed.

Chart 1985.

Although the passage westward of the Tessara islands is rarely used, and is considered unsafe for vessels of any size, those desiring to use this passage should proceed as follows:—When midway between Slut and Shingan islands keep Mitre rock in line with a dip in the hills behind, bearing 217° astern, as previously directed, until Brown rock is just open eastward of Fairway islet, bearing 007°, when steer for it on that bearing; when Cow's horn bears 292° course may be shaped to pass about 2 cables westward of Fairway islet. Then gradually bring the western side of Shingan island in line with the western side of Fairway islet, bearing 188° astern, which leads between Brown rock and Namoa rock; when Great Dragon islet is entirely open north-eastward of Brown rock, a more easterly course may be steered.

Tidal streams.—The tidal streams enter Hai tan strait during the rising tide by both the northern and southern entrances, and meet between Rocky islands and Middle island; in this vicinity, especially between Hill and Middle islands, there are heavy overfalls,

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Chart 1985.

dangerous to boats, when the wind is strong. During the falling tide the tidal streams separate between Rocky islands and Middle island, and run out by both the northern and southern entrances.

In the channel eastward of Pass rocks the tidal streams run in the direction of the channel, at a maximum rate of from 4 to 5 knots, but in the more open parts of the strait this rate is only from 2 to 3 knots.

The tidal stream entering Hai tan strait by the South-east entrance divides northward of Chim island, one portion flowing north-north-westward, and the other south-south-westward.

CHU SHAN.—South-eastern side.—Anchorage.—Rambler bay lies on the northern side of the headland forming the southern extremity of Chu shan, of which Hai tan point is the south-eastern extremity. On the north-eastern side of the bay are Trite island, described on page 112, and Vereker island; an islet, 101 feet (30^{m}8) high, lies about midway between Vereker island and the coast north-westward, and a rock lies about 1½ cables southward of this islet. There are some above water and sunken rocks in the southern part of the bay.

Chart 818, plan of Dwarf anchorage.

Hai head (*Lat. 25° 28′ N., Long. 119° 51′ E.*) lies about 2½ miles north-eastward of Vereker island, and Dwarf anchorage is westward of the head. This anchorage is frequently used by vessels unable to proceed against the north-east monsoon; it is safe as far as the holding ground is concerned, but during the north-east monsoon a heavy swell sets in, particularly at certain times of the tide, which causes a vessel to roll very heavily.

A rocky patch, with a depth of one fathom (1^{m}8) over it, lies about 6½ cables west-south-westward of Dwarf point, the south-western extremity of Hai head. A reef, which dries 10 feet (3^{m}0), lies about 2½ cables north-westward of Dwarf point; fishing stakes extend about 4 cables south-westward from this reef. A rock, 15 feet (4^{m}6) high, lies about one cable southward of Camfield point, situated about 3½ cables north-westward of Dwarf point.

Good anchorage can be obtained, in a depth of 5½ fathoms (9^{m}6) sand, with Turnabout island lighthouse (page 121) just open southward of Dwarf point, bearing 106°, and Camfield point bearing 007°; small vessels can anchor westward of Camfield point, in a depth of 3½ fathoms (6^{m}4), sand, with Dwarf point bearing 114°. H.M.S. *Alacrity* rode out a strong north-north-easterly gale in a position 5½ cables westward of Dwarf point, and found the holding ground good, with no inconvenience except for the swell setting round Dwarf point from about 2½ hours to half an hour before high water.

Eastern side.—Islets and dangers.—Chinsu islet lies on a drying reef extending about half a mile eastward from Hai head, and there are several other islets between it and the head; a 5-fathom (9^{m}1) patch lies about 2¾ cables south-westward of the southern extremity of Chinsu islet.

Chart 1985.

Lochinvar islets consist of three islets, with a number of rocks and reefs around; the largest islet, 103 feet (31^{m}4) high, lies with its south point about one mile north-eastward of the north-east point of Hai head. The passage between these islets and the coast is foul.

Charts 1761, 1968, 2412, 1262.

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Chart 1985.

Beal rock, with a least depth of 1¾ fathoms (3m2), lies about 7 cables east-north-eastward of the northern extremity of the largest of the Lochinvar islets. There are tide races for about three-quarters of a mile eastward of the Lochinvar islets.

Hai tan bay lies immediately northward of the Lochinvar islets and occupies the greater part of the east coast of Chu shan; the bay has only been partially examined, and there are numerous islets and rocks in it. Brown rock, about 1¼ miles south-eastward of the northern entrance point, is a steep-to pinnacle rock which dries 6 feet (1m8).

Tan head, the eastern extremity of Chu shan, rises steeply from the sea on its south-eastern side. Tan point, the north-eastern extremity of the head, is a low cliff with a hummock within; a shoal, with a rock 8 feet (2m4) high on it, extends about a quarter of a mile eastward from the point, and a rook, with a depth of less than 6 feet (1m8), lies about half a mile south-south-eastward of the point. Tan rocks, two of which dry 10 and 15 feet (3m0 and 4m6), respectively, lie about one mile eastward of Tan point. Dawson rock, about 2¼ miles north-eastward of Tan point, is a pinnacle with a depth of 4 fathoms (7m3).

North-eastern side.—Islands and dangers.—The land for about 3½ miles westward of Tan point is low, and then rises to the Kiun shan hills, the highest peak of which, Mount Pirie, is situated about 4 miles north-westward of Tan point; these hills slope on the north-western side to a flat sandy plain, and the land then rises again to a ridge of hills terminating in Saiang point (*Lat. 25° 40′ N., Long. 119° 47′ E.*), the north point of Chu shan.

Parry island lies with its south point nearly 2 miles north-westward of Tan point, and Kwing island lies about half a mile eastward of Parry island; the passage between these two islands, and that between Parry island and the coast, is obstructed by reefs and fishing stakes, and the tidal streams are strong, so they should not be used. A rock, which dries 10 feet (3m0), lies about half a mile east-south-eastward of Sharp peak, situated on the south-eastern side of Kwing island; a reef, which dries, lies about half a mile off the coast east of this island, and a rock which dries 9 feet (2m7) lies close off its north-eastern extremity. Vereker rocks are two pinnacles close together; the western, with a depth of 2¼ fathoms (4m1), lies about 2 miles north-eastward of Sharp peak, and the eastern has a depth of 3¼ fathoms (5m9).

Channel rock is an islet lying about 1½ miles north-westward of the north-west point of Kwing island; a rock, which dries 13 feet (4m0), lies about 3 cables south-eastward of Channel rock, and a rock which dries 20 feet (6m1) lies about the same distance north-westward. A reef extends about 6 cables northward from a point nearly 2 miles westward of Channel rock, and a group of rocks, which dries 6 feet (1m8), lies about one mile northward of this point; a shoal, with a least depth of 2¾ fathoms (5m0), was reported, in 1922, to lie about 1½ miles northward of the same point.

Cust islands, two in number, lie within a distance of 1¼ miles south-eastward of Saiang point. Triplet rocks consist of three rocky islets, the highest, 134 feet (40m9), lying nearly 1¾ miles east-north-eastward of Saiang point. There is no safe passage between the Triplet rocks and the coast.

Charts 1761, 1968, 2412, 1262.

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Chart 1985.

The western side of Chu shan is described with Hai tan strait.

Turnabout island and adjacent dangers.—Light.—Turnabout island, about 4¾ miles east-south-eastward of Hai head, is 218 feet (66m4) high; there are two small islets close off its southern side, and a rock awash lies about 1½ cables southward of the island. A rock, with a depth of less than 6 feet (1m8) over it, lies about 2 cables west-north-westward of the south-west point of Turnabout island. Sunda rock, which dries 3 feet (0m9), lies about 3½ cables northward of Turnabout island, with foul ground between. Turnabout island should be given a berth of fully three-quarters of a mile; several steam vessels have been hazarded by rounding the south point of the island too closely.

A light is exhibited, at an elevation of 257 feet (78m3), from a black circular tower, 54 feet (16m5) in height, situated on the summit of Turnabout island. A fog signal is sounded from the lighthouse.

Hai tan shoal, about 2 miles westward of Turnabout island, has a least depth of 6 fathoms (11m0) over it; at low water there are very heavy tide rips, and the water is much discoloured over the shoal.

Chart 1761.

A depth of 12 fathoms (21m9) was reported, in 1908, about 7 miles southward of Turnabout island. In 1929, the s.s. *Hai Yang* obtained a sounding of 11 fathoms (20m1) about 5¾ miles south-eastward of Turnabout island; soundings of 15 fathoms (27m4) were obtained 4¼ and 3½ miles north-eastward of this position, and the same depth was obtained 7½ miles south-westward of it, with a depth of 12 fathoms (21m9) between, the bottom in each case being sand. Towards the end of the same year H.M.S. *Magnolia*, sounding in the vicinity of the above positions, confirmed the sounding of 15 fathoms (27m4) obtained about 6 miles eastward of Turnabout island.

Outlying shoals.—Depths of 12, 10, and 14 fathoms (21m9, 18m3, and 25m6) have been obtained 22, 27, and 29, miles, respectively, eastward of Turnabout island.

In 1923, the U.S.S. *Ajax* reported a depth of 5 fathoms (9m1) about 46½ miles north-eastward of Turnabout island; this shoal has not been examined. In 1930, a depth of 15 fathoms (27m4) was reported to have been obtained about 15 miles northward of this position.

COAST.—Islets and dangers.—Light.—Between Cow's horn point (*Lat. 25° 45′ N., Long. 119° 38′ E.*), situated about 1¼ miles east-north-eastward of Cow's horn (page 116), and Niu to, a point about 9¼ miles northward, the coast consists of a sandy beach.

Chart 2400.

Niu to is a prominent point 97 feet (29m6) high. McCauley rock, about 1¼ miles north-eastward of Niu to, dries 3 feet (0m9), and a reef, which dries 18 feet (5m5), lies about half a mile westward of this rock. The coast betweeen Niu to and Sha feng chiao (Sand Peak point), about 7 miles northward, consists mostly of a sandy beach. A rock, which dries 7 feet (2m1), lies about 3¼ miles north-north-eastward of Niu to and about one mile offshore; Pu chiao, a rock 15 feet (4m6) high, lies about 1¼ miles southward of Niu shan tou (Black head), which is situated nearly 1¾ miles south-south-eastward

Charts 1968, 2412, 1262.

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Chart 2400.

of Sha feng chiao. Nan wu fu chiao (Chu chiang), an islet 70 feet (21m3) high, lies on the drying coastal bank between Niu shan tou and Sha fen chiao.

Ching fen (Sand peak), about 1¼ miles south-westward of Sha feng chiao, is a sharply defined summit; the sand on the eastern slopes of this hill often shows brightly through the mist when little else is visible. Mei Nua (Mei wa) is a village on the coast about one mile westward of Sha feng chiao. Ho shung shan, a peak of the Serrated range, about 7½ miles westward of the Sha feng chiao, is conspicuous.

Charts 2400, 1988.

The entrance to the Min kiang (page 126) lies between Sha feng chiao and a point about 11 miles northward. About midway between the latter point and Ragged point, about 20 miles north-eastward, is Tung shan peninsula. Mu shu is a small island lying about 4½ miles south-westward of the south point of this peninsula and about 2 miles offshore.

Ting hai bay, on the western side of Tung shan peninsula, is shoal but affords anchorage to small vessels during the north-east monsoon; there are the remains of a walled town on the shore of the bay. A number of islets and rocks, including Flat and Crab islets, lie southward and south-eastward of Tung shan peninsula. Square rocks, the outermost of these, consist of three islets surrounded by above water and sunken rocks lying within a distance of 3 miles southward of the peninsula.

Chart 1988.

Wanki bay, about midway between Tung shan peninsula and Ragged point, is frequented by junks and affords good shelter to vessels with local knowledge, but it is unsuitable for large vessels; a rock awash lies about a quarter of a mile westward of its eastern entrance point. Claret rocks, from 20 to 30 feet (6m1 to 9m1) high, are surrounded by other rocks above and below water, and the outermost of these lies about 1¾ miles southward of the eastern entrance point to Wanki bay.

A light is occasionally exhibited from a white beacon situated on a point about one mile eastward of the eastern entrance point to Wanki bay.

Ragged point is the extremity of a narrow peninsula extending in a north-easterly direction from Wanki bay; above water and sunken rocks extend nearly half a mile northward from the point. Diplo islet, with a reef extending nearly one cable from its south-east point, lies about half a mile south-eastward of Ragged point. The passage between this islet and Ragged point is used by small steam vessels with local knowledge, which frequently anchor under the lee of the islet lying close north-westward of the point, but the tidal streams are strong.

There is generally a heavy tide rip and much sea off Diplo islet during the north-east monsoon; during the flood tide there is a strong indraught into Ting hai bay and the northern side of the entrance to the Min kiang.

The coast northward of Ragged point is described in Chapter V.

Chart 2400.

Pai chuan lieh tao.—Pai chuan lieh tao (Pai kuen) is a group of

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Chart 2400.

three islands and several islets and rocks; Ling tau, the southern island of the group, lies about 15½ miles eastward of Niu to and is rocky and precipitous. *See* view on chart 2400.

Tung chuan (Tung kuen), separated from Ling tau by a shoal passage one cable wide, is rocky and precipitous. Ta yu, about 7 cables northward of the north-east point of Tung chuan, is a small islet with a remarkable thumb on its northern side; rocks above and below water extend about 1½ cables southward from Ta yu, and a reef, which dries 13 feet (4m0), lies about midway between the islet and the north-east point of Tung chuan. Shiaoyu, about one mile north-eastward of the north-east point of Tung chuan, is a rock 3 feet (0m9) high; a small rock, which dries 11 feet (3m4), lies close south-westward of Shiaoyu. Yung liu yu is an islet on a reef extending about half a mile northward from Tung chuan. Hsi niu yu (Si niu au) is a rock about 4 cables westward of Yung liu yu and another rock lies about a cable south-westward of Hsi niu yu; both these rocks lie on a reef which extends about 2 cables from them in all directions, and a spit, with depths of from 2½ to 5 fathoms (4m1 to 9m1), extends about one mile south-south-westward.

Hsi chuan (Tung sha) lies nearly 1½ miles north-westward of Tung chuan, and its summit is a boulder on the middle of three rounded hummocks; the south-western slopes of the ridge are strewn with sand, and show white in misty weather when little else of the island is visible. Po lan shih or Breakwater rock, 53 feet (16m2) high, lies on the outer end of a rocky ridge extending about half a mile south-westward from the north-west point of Hsi chuan; this rock, and another rock, 33 feet (10m1) high, on the ridge, are conspicuous; a sandy spit, with depths of less than 5 fathoms (9m1), extends about one mile south-westward from the south-western side of Hsi chuan. Underwood banks, with a least depth of 4 fathoms (7m3), lie within a distance of 3 mile south-westward of Hsi chuan.

Light.—Fog signal.—A light is exhibited, at an elevation of 257 feet (78m3), from a white circular tower, 64 feet (19m5) in height, situated on the north-eastern part of Tung chuan. A fog signal is sounded from the lighthouse.

Anchorage.—Tung sha road, off the south-western side of Hsi chuan, affords the best anchorage for vessels from the southward waiting to cross the Min kiang bar; the best position is in a depth of 3½ fathoms (6m9), sand, with the summit of Matsu (page 124) in line with the 33-foot (10m1) high rock near Po lan shih (*Lat. 25° 59′ N., Long. 119° 55′ E.*), bearing about 000°, and the summit of Yung liu yu in line with the south point of Hsi chuan, bearing about 080°.

Rocks between Pai chuan lieh tao and Matsu.—Hsi pi shih (Hebe rock), about midway between Pai chuan lieh tao and Matsu, situated about 9½ miles northward, is a pinnacle with a depth of 1¾ fathoms (3m2); a second pinnacle, with a depth of 3 fathoms (5m5), lies about one cable north-north-eastward, and another, with a depth of 4½ fathoms (8m2), lies about 1½ cables east-north-eastward. The sea rarely breaks on Hsi pi shih even with strong north-easterly winds, nor is there any swirl or disturbance of the water to indicate foul ground.

Liu chuan chiao (Sea Dog), nearly 1½ miles north-eastward of

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Chart 2400.

Hsi pi shih, is a precipitous black rock, 164 feet (50m0) high; a small rock, 33 feet (10m1) high, lies close eastward of Liu chuan chiao, and foul ground extends about 3 cables northward and north-westward.

Kao chiu chiao (Pup), a rock 22 feet (6m7) high, lies nearly 4 cables north-north-eastward of Liu chuan chiao.

Pei chuan chiao (Sea Cat), about 1¾ miles north-north-eastward of Liu chuan chiao, is a conspicuous black rock 20 feet (6m1) high; a rock three-quarters of a cable westward of it dries 13 feet (4m0). A 3½-fathom (5m9) patch lies about one cable south-westward of Pei chuan chiao.

Pilot rock, nearly 3 miles eastward of Pei chuan chiao, is a pinnacle with a depth of one foot (0m3) over it; the sea seldom breaks on this rock except at low water.

Tai shih (Norman Court rocks), nearly 1½ miles northward of Pei chuan chiao, are a group of rocky heads with depths of from 5 feet (1m5) to 3 fathoms (5m5). Hsieh chiao (Flat rock), 10 feet (3m0) high, lies close northward of Tai shih, and there is foul ground close around this rock.

Matsu.—Anchorages.—Matsu or Nan kan tang is a hilly island, thickly populated and cultivated. Huang kuan yu (Wu an) is the largest of several islets and rocks lying close off the eastern extremity of Matsu. *See* view on chart 2400 and view facing page 127.

Hou ou (Pirie bay), on the northern side of Matsu, affords good shelter with winds between east and west-north-west, through south, in a depth of 5 fathoms (9m1), about 3 cables offshore, but it is a bad anchorage on account of its rocky bottom. A 4½-fathom (8m2) patch lies about 6 cables east-north-eastward of Han lin chiao (Hamelin point), the north-west point of Matsu.

Matsu ou, on the western side of the island, is a more frequented anchorage, with good holding ground, sheltered from the prevailing north-east wind and also from the swell; it is convenient for vessels from the northward waiting to enter the Min kiang. Vessels not exceeding 18 feet (5m5) in draught can anchor about 3 cables offshore, with the western end of Hsi chuan in line with Pai ya chiao (Bayard point), the south-west point of Matsu, bearing about 175°, and a gap in the hills bearing 072°. There are fishing stakes in the vicinity of this anchorage.

Matsu strait.—Dangers.—Matsu strait, between Matsu and Pei kan tang (Tang ki), has a navigable width of nearly one mile between the reefs on either side. Tung shih (Pirie rock), a pinnacle with a depth of 3½ fathoms (6m4), lies in the fairway and about 7 cables north-north-westward of the summit of Huang kuan yu. Yen shih (Swallow rock) lies on the northern side of the strait and about 1¼ miles north-north-eastward of the summit of Huang kuan yu, and has a depth of 3 feet (0m9) over it; Chiao shih (Magpie rock), about 2 cables north-westward of Yen shih, is 35 feet (10m7) high. A 3½-fathom (6m4) patch lies in the passage between Chiao shih and Ko li (Kia lai), an islet close off the south point of Pei kan tang, to which it is connected by a drying ridge of stones and sand. Chin yu (Chung she) is a small islet lying about 1¾ miles west-north-westward of Ko li.

Pei kan tang; adjacent islands and rocks.—Pei kan tang is an island rising to two conspicuous peaks, the highest being

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Chart 2400.

947 feet (288m6) high. The south-eastern part of the island is connected to the remainder by a sandy isthmus. There are several villages on the island, which is well cultivated. Good shelter from north-east winds can be obtained in Magpie bay, on the southern side of the sandy isthmus, in a depth of 4½ fathoms (8m2), mud, with the summit of Tang ki tau (*Lat. 26° 13′ N., Long. 120° 01′ E.*), an islet close off the south-eastern extremity of Pei kan tang, bearing 126°, distant half a mile.

Bluff head is the eastern extremity of an island about 2½ cables off the north-east coast of Pei kan tang.

Ching au is separated from the northern end of Pei kan tang by a channel 2 cables wide, partly obstructed, however, by a reef, with a depth of 3½ fathoms (5m9), extending about one cable southward from Ching au. Kiao tse is almost connected to the north-east point of Ching au. A rock, which dries 18 feet (5m5), lies close off the north-west point of Ching au; a group of rocks, the northern and highest of which is 72 feet (21m9) high, lies nearly half a mile north-north-westward of this point. A rock, with a depth of 1½ fathoms (2m7) over it, was reported, in 1906, to exist about a quarter of a mile north-north-eastward of the 72-foot (21m9) high rock.

The south-western of the Trio rocks lies about 1¾ miles south-eastward of Bluff head and is 46 feet (14m0) high. The north-eastern and largest rock, nearly 2½ miles eastward of Bluff head, is 101 feet (30m8) high and is split into two parts; close south-eastward of it is a rock which dries 17 feet (5m2). The third rock lies about a quarter of a mile south-south-eastward of the highest rock and is 78 feet (23m8) high. There is a safe channel between these rocks and Pei kan tang.

Chart 1988.

Pai sha lies about 1½ miles north-westward of Ching au, and rises to an elevation of 560 feet (170m7) at its southern end; foul ground extends nearly one mile eastward from this island. The middle of the passage between Pai sha and Ching au is obstructed by the rocks lying north-westward of the latter, described above. An islet lies close off the west point of Pai sha, and about half a mile west-north-westward of this point is Gordon rock, which dries 7 feet (2m1). A rock, 10 feet (3m0) high, lies about 1½ cables west-north-westward of the north point of Pai sha, with foul ground between, and about 1½ miles north-eastward of this point is a black rock, 25 feet (7m6) high.

Off-lying rock.—Black rock, 70 feet (21m3) high, lies about 7½ miles north-eastward of the north point of Pai sha and about 6½ miles eastward of Ragged point; there is discoloured water northward of the rock. Bamboo ropes, connecting floating stakes to fish traps, are laid westward and south-westward of Black rock.

Chart 1761.

Outlying islands and rocks.—Tungsha or Alligator islet (*Lat. 26° 09′ N., Long. 120° 24′ E.*), about 24 miles eastward of Matsu, is a barren rock about 40 feet (12m2) high.

Tung yung, about 13½ miles north-north-eastward of Tungsha, is an island about 500 feet (152m4) high, with steep cliffy coasts; there is a large village on its western side. Rocky ledges extend about a quarter of a mile from its south-western side. Another island lies

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Chart 1761.

close north-westward of Tung yung, and appears as part of that island except on north-easterly or south-westerly bearings; a reef extends about half a mile northward from the western island. The narrow passage between these two islands is shoal, and a rock lies in the fairway. Bertha cove, on the southern side of the western island, affords good anchorage and smooth water, during the north-east monsoon, for vessels with local knowledge, in depths of from 4 to 6 fathoms (7m3 to 11m0). In March, 1931, H.M.S. *Stormcloud* anchored off Bertha cove, in a depth of about 10 fathoms (18m3), and found good shelter and holding ground; the anchorage was approached bearing 000°, which then lead clear of all fishing stakes. A steam vessel should not approach Bertha cove after dark, as it is encumbered with bamboo ropes connecting floating stakes to fish traps, which would probably foul the propeller. Similar obstructions exist south-westward of Larne islet.

Larne islet lies about 14 miles westward of Tung yung, and has some large boulders on it. A ledge extends about half a mile south-westward from the islet; a rock awash lies close off the north point, and a rock 9 feet (2m7) high lies about 2 cables eastward of this point. Larne rock, about 5 miles southward of Larne islet, is low and flat; a reef extends about 2 cables northward. A reef awash lies about 5 miles north-north-westward of Larne islet; its position is stated to have been passed over on several occasions without any indication of shoal water having been seen. The islands and dangers northward of Black rock are described with the Port of San-tu-ao on page 200.

Light.—Fog Signal.—A light is exhibited, at an elevation of 325 feet (99m1), from a white circular tower, 46 feet (14m0) in height, situated on the eastern slope of Tung yung; two white square buildings are situated on the slope of the hill immediately above the lighthouse. A fog signal is sounded from the lighthouse. *See* view facing this page.

Chart 2400.

MIN KIANG.—The mouth of the Min kiang lies between Sha feng chiao (page 121) and a point about 11 miles northward, but this space is mostly occupied by the islands Huang chi shan (Wufu), Wei tou tao (Woga), and Chuan shih tao (Sharp Peak island), as well as a number of islets and banks, between which are various passages. Only one channel, that along the southern sides of Chuan shih tao and Wei tou tao, is buoyed and is in general use. The passage along the southern side of Huang chi shan has only been partially examined, and is not used by shipping. Wei tou (Woga) channel, between Wei tou tao and Chuan shih tao, is narrow, intricate, and unsuitable for general shipping; it is much used by junks, and these emerge from the river in fleets conducted by a single pilot. The channel northward of Wei tou tao is dangerous for navigation, and it is blocked by a stone barrier at Wu chu men, by the north-west point of Wei tou tao.

The bar extends for a distance of about 8 miles eastward of the south-eastern extremity of Huang chi shan, and consists of hard sand, which dries in places; the heavy rollers on the bar caused by a gale soon subside. In 1935, the least depth on the outer bar of the main

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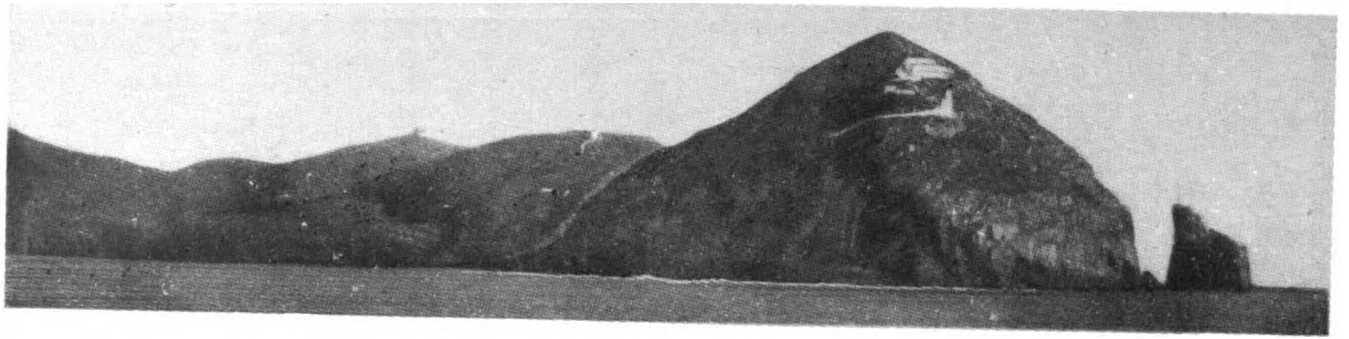
To face page 126.



Tung yung lighthouse from eastward.
(Original dated 1932).

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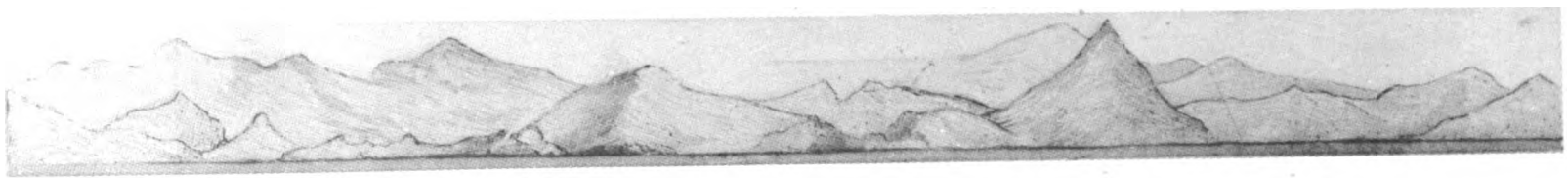
Matsu. *Pei kan ang.* *Liu chuan chiao, bearing 028°, one mile.*

Matsu and Liu chuan chiao from near Hsi pi shih.

Original dated 1845).



Entrance.

Pai ta, bearing about 298°.

Sharp peak on Chuan shih tao

Entrance to the Min kiang.

Origina dated 1845).

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Chart 2400.

channel was 14 feet (4m3), and on the inner bar, southward of Chuan shih tao, 10½ feet (3m2). On account of the changes constantly taking place in the channel over the bar and in the river caution is necessary, and the river must not be entered without a pilot, who must be relied on implicitly. As a rule the pilots do not take a vessel exceeding 24½ feet (7m5) in draught over the bar, but during the north-east monsoon, at spring tides, vessels with a draught of 26½ feet (8m1) can reach Ma wei anchorage (page 131). *See* views facing pages 127, 128, 129.

Charts 2400, 1988.

Approaches.—There are three main approaches to the Min kiang. From the southward: between Hsi chuan and the coast of the mainland. From the eastward: between Pai chuan lieh tao and Matsu. From the northward: between Ragged point and Pai sha, and thence westward of Pei kan tang and Matsu.

The water for many miles outside the river is muddy and discoloured, so that sunken rocks or shoals are not visible unless marked by breakers.

Chart 2400.

Pilots.—Chinese pilots qualified to pilot vessels from the sea to Ma wei anchorage, under the jurisdiction of the Harbour master at that anchorage, cruise in boats off Matsu road during the north-east monsoon, and between the bar and Matsu during the south-west monsoon; during the latter monsoon, if necessary to obtain shelter, the pilots go to Hou ou in Matsu. In heavy weather, when the pilots are unable to be on the cruising ground, vessels should approach Matsu ou and sound five blasts on the siren or steam whistle.

The pilot boats are painted yellow, with no distinguishing marks on them or their sails; when on pilotage duty they fly a flag the upper half white and the lower half red. Only licensed pilots should be engaged.

Vessels proceeding to Ma wei anchorage or Nantai, and requiring a pilot, should make the request through the British Consul at Foochow, informing him of the time of arrival off Chi hsing chiao (*Lat. 26° 05′ N., Long. 119° 49′ E.*); on arrival at either of these places the Harbour master should be informed at an early date if a pilot is required on leaving. It is not considered necessary for vessels with a draught of less than 13 feet (4m0) to employ a pilot on leaving Ma wei anchorage, provided that all the buoys are in position and have been checked on the passage up.

Tidal streams.—The west-going stream runs from 4½ hours before high water until 1½ hours after high water, and sets in towards Chuan shih tao from the north-eastward; the east-going stream runs from 1½ hours after high water until 4½ hours before the next high water, except during freshets, when it begins earlier and runs for a much longer period.

During the rainy season in April, May, and June, the west-going stream runs for a shorter period, and the east-going stream is correspondingly longer. During heavy freshets vessels do not swing to the west-going stream.

Off-lying dangers.—Buoys.—Chi hsing chiao (Outer Min reef), about 7¾ miles north-eastward of Sha feng chiao, is a shoal with some drying rocks on it; two of these rocks are sharp pinnacles which

Charts 1761, 2412, 1262.

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Chart 2400.

dry 13 feet (4m0). Two flat rocks lie one and 2 cables, respectively, southward of the north-eastern pinnacle; the northern of these two rocks dries 8 feet (2m4), and the southern 6 feet (1m8), and foul ground extends about one cable south-eastward from the latter. Fan chu shih (Bisbee rock), about 3 cables northward of the south-western pinnacle of Chi hsing chiao, is a pinnacle with a depth of 2 fathoms (3m7); foul ground extends one cable northward from Fan chu shih. A red and white chequered whistle buoy, with "Min" painted on it in white, is moored about 4½ cables east-north-eastward of the north-eastern pinnacle of Chi hsing chiao. High Sharp peak, situated about three-quarters of a mile north-north-westward of the north-west point of Wei tou tao, bearing 292° and just open northward of the northern side of Chuan shih tao, leads northward of Chi hsing chiao and over the position of the buoy.

Pan yang chiao (Aymar rock), about 4¾ miles northward of Chi hsing chiao, is a pinnacle with a depth of 3 feet (0m9). A red and black chequered buoy, with "Aymar" painted on it in white, surmounted by a black diamond, is moored about 2¾ cables east-south-eastward of Pan yang chiao.

Lung ya shih (Europe rocks) lie in the approach to Wei tou channel and about 2¾ miles north-eastward of Chuan shih tao; they consist of two heads, about 2½ cables apart, with a depth of 4 feet (1m3) over each, sand and mud over rock. A black buoy, privately maintained, marks these rocks.

Main channel over the bar.—Buoys.—Changes are frequently taking place in the channel over the bar, and the positions of the buoys are approximate only; these buoys are also liable to be washed away.

Entrance buoy lies about 2¼ miles north-westward of Chi hsing chiao, and is moored on the northern side of the entrance to the channel; it is a red buoy surmounted by a black sphere.

Central buoy, on the northern side of the channel and about 4½ miles west-north-westward of Chi hsing chiao, is a red buoy surmounted by a black inverted frustum.

Jih chuang chiao (Rees rock), about 5½ miles westward of Chi hsing chiao, is a black pinnacle which dries 19 feet (5m8).

Inner buoy, about 2 miles north-westward of Jih chuang chiao and on the northern side of the channel, is a red buoy surmounted by a black sphere. The Inner bar lies close westward of this buoy.

I mi shih (Eme rock), a pinnacle with a depth of 6 feet (1m8), lies about 4 cables westward of the south point of Chuan shih tao; a red buoy is moored close south-eastward of this rock and on the northern side of the channel.

Anchorage can be obtained between the Outer and Inner bars in a pool with depths of from 3¾ to 5 fathoms (6m9 to 9m1), but this anchorage is reported to give no protection to vessels at high water.

Inner bar to Ma wei.—Buoys and beacons.—The main channel of the Min kiang passes northward of Huang chi shan and southward of Chuan shih tao and Wei tou tao. Pai yun shan (Square peak), (*Lat. 26° 05′ N., Long. 119° 37′ E.*), the summit of Huang chi shan, is conspicuous.

Pai ta (East Brother) is an islet on the southern side of the fairway and about 1½ miles west-north-westward of the south point of Chuan shih tao; Ching yu (West Brother) lies about half a mile farther

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a

Cow's horn.

a

a

b

a

Chin feng.

b

Round island.

View, in five parts, of the entrance to the Min kiang (*Continued overleaf*).

(Original dated 1845).

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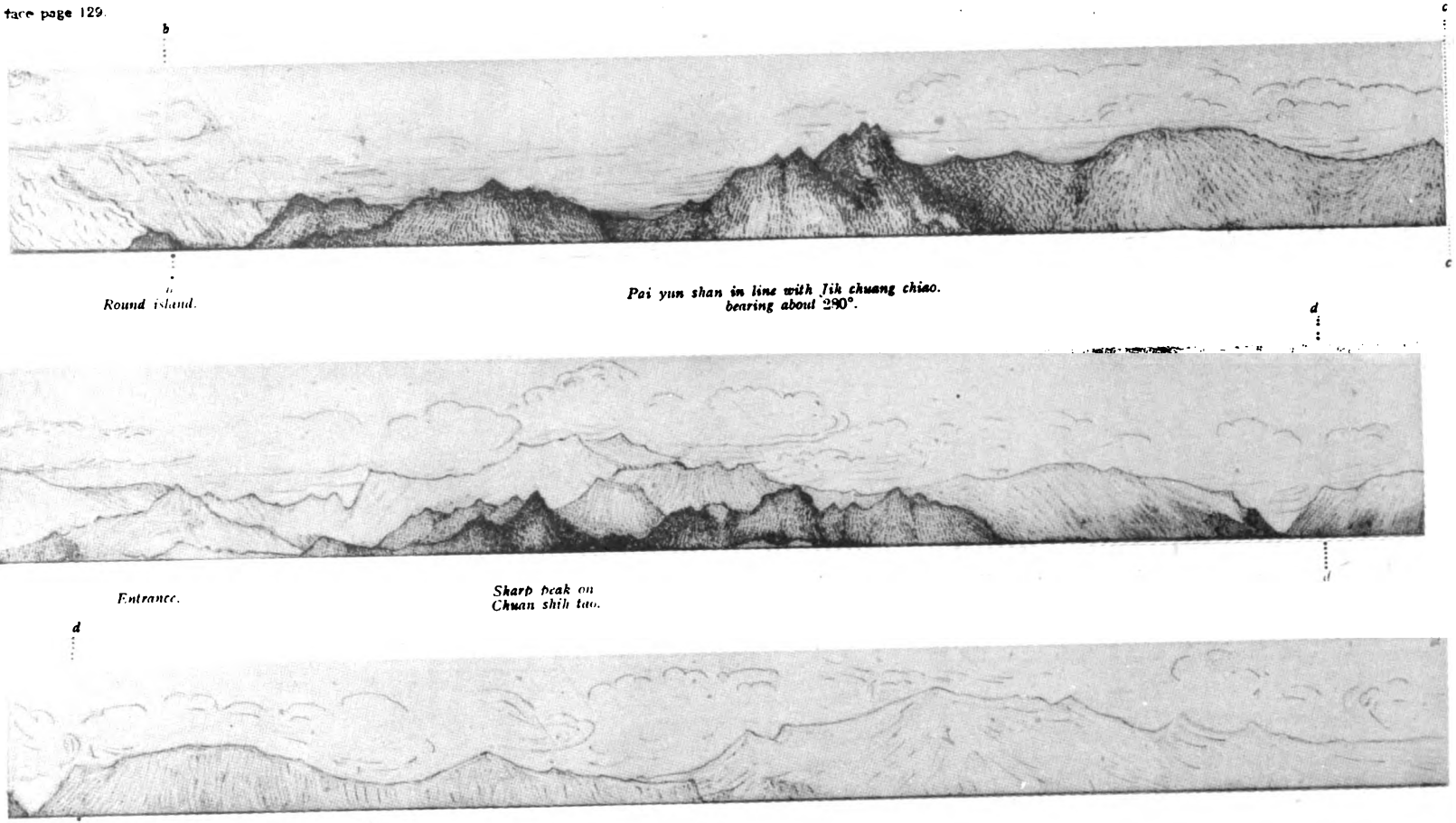
To face page 129.



View, in five parts, of the entrance to the Min kiang (*Continued from other side of page*).

(*Original dated 1845*).

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Chart 2400.

west-north-westward. A bank, some of which is above water, extends fully one mile westward from Ching yu, and close northward of the western part of this bank is Yeh ya shih (Wild Duck rock), which dries 5 feet (1m6); a stone barrier extends about 1½ cables north-westward from this rock, and its outer end is marked by a black conical buoy. Hsi feng shih (Zephyr rock), a pinnacle with a depth of 3 feet (0m9), lies about one cable off the southern extremity of Wei tou tao, situated on the northern side of the channel opposite Ching yu; the depths in this vicinity are very irregular, which causes a heavy overfall during the strength of the tidal stream. Temple rock, with a depth of 1¾ fathoms (3m2), lies on the northern side of the channel and about 8 cables westward of the southern extremity of Wei tou tao; Temple rock is marked by a red buoy, and the channel here, between this buoy and the buoy marking the stone barrier, is only about 1½ cables wide.

Chart 2400, plan of Kinpai pass.

Nan kuei (Salamis islet) lies on the southern side of the channel nearly 2 miles westward of Ching yu; Pei kuei (Pass islet) lies on the northern side of the channel and about 2½ cables north-north-westward of Nan kuei. Po ching yu (Oriental rock), about 1½ cables south-westward of Pei kuei, covers at high water, and is marked by a red spar beacon surmounted by a daymark, 14 feet (4m5) in height; vessels must pass not less than one-sixth of a cable southward of this beacon. Chin pai men (Kinpai pass), entered from the eastward between Po ching yu and Nan kuei, is dangerous for strangers, particularly at or near spring tides, as the rapid tidal streams then cause eddies that occasionally cross the channel, in which case a vessel might refuse to answer her helm; the pass should, therefore, never be taken without local knowledge, and then only at slack water. Vessels should avoid meeting or passing each other in Chin pai men; those proceeding against the stream must wait clear of the pass until those going with the stream are clear thereof. There is a flagstaff on the north point of Huang chi shan, which forms the southern side of the pass. Chin pai sha (Middle ground), with a least depth of 4 feet (1m2), extends nearly one mile westward from the north point of Huang chi shan and is constantly changing; the channel southward of this shoal has silted up, but there is a deep passage northward of it. Li shih, a rocky shoal with a least depth of 9 feet (2m7), lies near the western end of Chin pai sha and about 3½ cables off the southern side of the river. A black truncated conical buoy, known as Kinpai Middle ground buoy, is moored on the northern edge of Chin pai sha.

Chart 2400.

Shih sui (Rocky head) is a point on the northern side of the river about 1¾ miles westward of the north point of Huang chi shan. Yung yu (Wedge islet) lies about 1½ miles south-south-westward of Shih sui, on the outer edge of a narrow bank extending from the western side of the river. A bank, which dries in patches, extends more than half way across the river from the north-western side of Huang chi shan and is known as Huang chi shoal; a black spar buoy is moored on the outer edge of this shoal and about 4 cables southward of Yung yu. Ta lu chiao (Half-tide rock) lies on the southern part of Huang chi shoal and nearly one mile southward of Yung yu, and is submerged 5 feet (1m5) at high water spring tides; a black granite

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Chart 2400.

beacon stands on this rock. Lung chiao (Stevens point) (*Lat. 26° 05′ N., Long. 119° 31′ E.*) is situated on the western bank and about 1½ miles south-south-westward of Yung yu; a reef extends half a cable south-eastward from this point, and the outer end of the reef is marked by a red pole beacon, surmounted by a daymark, which must be given a berth of one cable. Hsing feng chiao is a rocky ledge, with a least depth of 3 feet (0m9), lying close off the western bank and about three-quarters of a mile south-south-westward of Lung chiao; a red buoy is moored close eastward of this ledge.

Min an men (Mingan pass) is entered about three-quarters of a mile southward of Hsing feng chiao, and is a portion of the river nearly 3 miles in length and about 3 cables wide; the shores on either side are fairly steep-to, with high land close within. The town of Min an (Mingan) is situated on the western bank, about 1½ miles above Hsing feng chiao. Yuan shan (Couding islet), on which is a conspicuous white mark, lies close off the same bank and nearly three-quarters of a mile above Min an; Ho chiao (Scout rock), with a depth of less than 6 feet (1m8), lies close off the eastern side of Yuan shan. Vessels proceeding down the river with an out-going stream must guard against an eddy setting on to Ho chiao.

Chart 166.

Ta yu (Taseu) is situated on the eastern side of the southern end of Min an men, and is of a light colour owing to its being cultivated and covered with vegetation; a red pole beacon stands on its summit. A spit, with depths of 18 feet (5m5) and less, extends about 2½ cables northward from the island. Niao yu chiao (Hurst rock), with a depth of 4 feet (1m2), lies on a rocky ledge extending about half a cable from the south-western extremity of Ta yu; a black buoy marks the western edge of this ledge. Niu chiao (Niu tau rock), with a least depth of 3 feet (0m9), is a patch of rocky ground lying about 2 cables westward of Ta yu; a red buoy is moored off the eastern side of this patch, and a black buoy off its western side. In 1935 the channel lay westward of the black buoy, as that between Niu chiao east buoy and the buoy marking Niao yu chiao had silted up. Hsiao yu (Flat islet) lies about 2½ cables southward of Ta yu and is connected to it by a drying flat; a conspicuous tree, 25 feet (7m6) high, stands on its southern end.

Kiang hsi chiao (Watters rock) lies about one cable off the eastern bank of the river and about 1½ miles above Hsiao yu, and is awash at high water; a white pole beacon, surmounted by a sphere, stands on this rock. There is a flagstaff on the point about 3 cables south-westward of Kiang hsi chiao, and about three-quarters of a mile farther southward is Customs point, on which is a Custom house and a flagstaff. On the opposite side of the river and about 8 cables north-north-westward of Customs point, is a village named Lo hsing ta, and a pagoda, 92 feet (28m0) high, which stands on a hill 93 feet (28m3) high; there is a conspicuous chimney about 1½ cables north-eastward of Lo hsing ta. A bank, which dries, with portions of flat cultivated land always above water, extends from the western side of the river nearly as far northward as the parallel of Niu chiao; this bank is continually changing. A red spar buoy is moored off the eastern edge of this bank, about 2 cables west-north-westward of Kiang hsi chiao beacon. The river divides at Customs point, one branch, named Nan

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Chart 166.

kiang, running in a westerly direction, and the other, named Pei kiang, north-westward to Nantai.

Hsiao ma chiao (Pagoda rock), nearly 2 cables southward of Lo hsing ta, is a pinnacle which dries 8 feet (2m4), and foul ground extends about a quarter of a cable westward. Westward of Hsiao ma chiao (*Lat. 25° 59′ N., Long. 119° 27′ E.*), at the confluence of the Nan kiang and Pei kiang, the river is obstructed by partly drying sandbanks which are extending eastward; these sandbanks are constantly changing, especially at freshets.

Ma wei (Mamoi) is a large Chinese village situated on the eastern entrance point of the Pei kiang and about 4 cables west-north-westward of Lo hsing ta. There is a small European settlement on the hill above the village. Ta ma chiao (Mamoi rock), a pinnacle which dries 11 feet (3m4), lies about one cable westward of the above point; a small rock lies close offshore between Ta ma chiao and the point.

Lights.—A light is exhibited, at an elevation of 16 feet (4m9), from a red iron pile beacon surmounted by a daymark, 28 feet (8m5) in height, on Hsiao ma chiao.

A light is exhibited, at an elevation of 13 feet (4m0) from a red beacon surmounted by a daymark, situated on Ta ma chiao; this light is unreliable, as the rock cannot be approached in bad weather.

Ma wei anchorage.—Ma wei anchorage (Pagoda anchorage), south-eastward and eastward of Lo hsing ta, is about 22 miles above the outer bar of the Min kiang and 11 miles below the city of Foochow, of which it is the port. Considerable scouring has taken place between Kiang hsi chiao and Hsiao ma chiao, thereby widening the anchorage in this vicinity.

At the end of 1933 there was a double line of mooring berths, 1¼ cables apart, off the shore between Customs point and the point about 8 cables north-eastward. The south-eastern line of berths, numbered 1 to 6, lies with the centre of the group of trees on the 141-foot (43m0) hill in line with Kiang hsi chiao beacon, bearing 051°. The inner or Mamoi berths are numbered 1 to 5, and all lie with the point 1¼ miles north-eastward of Customs point bearing 051°. There is thus a berth No. 1 and a berth Mamoi No. 1, and so on; a conspicuous numeral is painted on the foreshore, corresponding to the number of each berth, to show where the vessel's stem should be when middled. Vessels given a numbered berth above 6 may moor at any convenient distance offshore abreast the mark for her berth in the vicinity of Kiang hsi chiao; these marks are numbered 7 to 10, No. 7 being about 2¼ cables south-westward of Kiang hsi chiao beacon, and No. 10 nearly 3¼ cables north-eastward of the same beacon. In 1935 an additional line of three berths was established, approximately 1¼ cables 321° from Mamoi berths Nos. 3, 4, and 5, respectively. Vessels of deep draught should take care not to be set up the river beyond the line joining Ta ma chiao beacon and Ying chien kiang, as the bank westward of this line is extending eastward. There is sufficient space for a vessel with a length of 470 feet (143m3) at any of the numbered berths. The berth allotted to a vessel arriving is indicated by flags at the Custom house on the right bank.

There are two T-shaped wharves at Lo hsing ta; vessels should not moor within a distance of one cable from these wharves, so as to allow sufficient room for vessels using them to swing.

Charts 2400, 1761, 2412, 1262.

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Chart 166.

The steps below the Post office and the Naval yard steps at Ma wei are suitable for landing at all times. Boats using the slipway below the Harbour master's office on the southern shore should do so with caution, especially at low water.

Tidal streams.—The water in the river is generally highest in the north-east monsoon, and lowest in the south-west monsoon. Remarkable rises of the water occur now and then, as in August, 1885, during a typhoon, when spring tides rose 24 feet (7m3).

The tidal streams at Ma wei anchorage run in the direction of the deep channel at a rate of from one to 3 knots according to the age of the moon. The out-going stream during freshets attains a rate of over 5 knots, but in the confined portions of the river, particularly at Chin pai men and between Min an men and Ta yu, it often exceeds 7 knots, and great care is necessary in navigating these parts of the river on account of the strong eddies.

The in-going stream begins 5¼ hours before high water, and the out-going an hour after high water, except during heavy rains in the interior, when it commences earlier, and sometimes overcomes the in-going stream altogether.

The height of the tides and the times of the turning of the streams are influenced by the direction and force of the wind.

Freshets occur occasionally after heavy rain in June, July, and August. In August, 1886, the ships in Ma wei anchorage did not swing to the in-going stream for three days, and several dragged their moorings.

Regulations.—Vessels anchoring in the Port of Foochow are subject to the Rules and Regulations of the Chinese Maritime Customs, extracts of which are given below.

1. The Port includes all that part of the Min kiang between Chin pai men and the stone bridge across the river at Nantai.
2. The anchorage known as Ma wei anchorage, within the limits of which all foreign vessels (excepting those going up the river to Foochow) shall lie when loading or discharging, is that part of the river above No. 9 mark on the southern side and below a straight line running west from Mamoi point (*Lat. 25° 59′ N., Long. 119° 27′ E.*) to the opposite side of the river.
3. Vessels proceeding up the river to Foochow shall load and discharge between the stone bridge and Messrs, Jardine, Matheson & Co.'s jetty, unless special permission is obtained from the Customs Authorities to work elsewhere.
4. Any vessels nearing the anchorage shall be boarded by the deputy of the Harbour master; the pilot on board shall moor the vessel in a safe berth.
5. Vessels shall take up the berths assigned to them by the Harbour master, or by his deputy, and shall on no account change berth without first having obtained permission from the Harbour master. They shall, however, shift berth if required to do so by the Harbour master.
6. All vessels shall be moored taut, and shall keep a clear hawse.
7. All vessels lying in the anchorage shall exhibit two bright lights from sunset to sunrise; one, the riding light, where it can best be seen, not less than 20 feet (6m1) above the deck, and the other at the stern.

Charts 2400, 1761, 2412, 1262.

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Chart 166.

8. A vessel arriving with a contagious or infectious disease on board, or a disease regarding the contagious or infectious nature of which there may be doubt or suspicion, or a vessel any of whose passengers or crew have died since leaving the last port, or on board which there is a corpse other than one regularly shipped as freight, shall not come nearer than the No. 9 mark on the south side of the harbour. She must fly at the fore the Quarantine or Plague flag (Q or L flags of the International Code of Signals) and must allow no one to embark or to disembark without permission from the Harbour master's office.

9. Cannon, small arms, rockets, or other signal lights shall not be fired on board any vessel within the limits of the Port, without written permission from the Harbour master's office.

10. Ballast or ashes must not be thrown into the river between Outer Min reef buoy and the stone bridge at Nantai, but must be put into ballast boats and landed above high water mark. Care must be taken to prevent any ballast, etc., from falling overboard in handling.

11. Vessels arriving at the port with explosives or other dangerous cargo in whatever quantity (except kerosene) shall anchor or moor one mile below the lower limit of the harbour, and shall abide by the instructions of the Harbour master concerning discharge.

12. Vessels arriving with kerosene or other inflammable or dangerous cargo shall exhibit a red flag at the fore by day and a *red* light at night. They may work cargo between sunset and sunrise. All reasonable precautions must be taken against fire. Kerosene may be discharged during the night, in which case a special permit is required.

13. Except for some reasonable purpose, *e.g.* to signal their arrival or departure, vessels are forbidden to sound their steam-whistles or sirens within the limits of the anchorage.

Chart 2400.

Directions.—The best time for a vessel with a speed of 10 knots to arrive at the outer bar is at high water; in March 1935, H.M.S. *Grimsby* arrived at the Entrance buoy at high water on the outer bar, and encountered slack water all the way to Ma wei anchorage. The directions given hereafter are from the latest information received in 1933.

The bar is crossed by passing close southward of Entrance, Central, and Inner buoys. From the Inner buoy course may be shaped to pass southward of I mi shih buoy, and thence between the red buoy marking Temple rock and the black buoy marking the stone barrier, having previously taken care to avoid Hsi feng shih (*Lat. 26° 08′ N., Long. 119° 38′ E.*). A westerly course may then be steered to pass northward of Nan kuei, and not less than one-sixth of a cable southward of the beacon on Po ching yu. When nearing Chin pai men from either end vessels must herald their approach by one long blast on the whistle, and, if there is any probability of their meeting in the pass, the steam vessel going with the tidal stream has the right to proceed through first. Thence pass between the buoy marking Chin pai sha and the northern shore, and, when past this buoy, steer for a conspicuous clump of trees in Tang kuan, a small village about 3 cables northward of Yung yu, bearing 238°; when the eastern

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Chart 2400.

extremity of Yung yu bears 222° steer for it on that bearing, subsequently altering course to about 211° so as to pass fairly close eastward of this islet. The regulations given for Chin pai men hold good for Min an men.

Chart 166.

After proceeding through Min an men, vessels should pass close westward of the black buoy moored off the western side of Niu chiao, and then steer for the beacon on Kiang hsi chiao bearing 201°; in 1933, the least depth on this last course was 24 feet (7m3). After passing westward of Kiang hsi chiao, the allotted berth may be taken up as given in the description of Ma wei anchorage on page 131.

Harbour facilities.—Fuel oil can be obtained at Ma wei anchorage; there is one lighter, with a capacity of 27 tons, pumping one ton per hour. Large quantities of coal can be supplied in baskets from lighters, at the rate of 40 tons per hour.

Fresh provisions are plentiful. There is one small hospital.

The Naval yard is situated on the northern end of Ma wei, and is furnished with modern appliances; large repairs can be executed. There is a Government dry dock close north-eastward of Lo hsing ta; *see* Appendix I.

Storm signals are exhibited at the flagstaff of the Custom house (*Lat. 25° 58′ N., Long. 119° 27′ E.*); *see* page 27.

Shipping.—In 1935, 746 steam vessels, totalling 743,530 tons, entered the harbour.

Chart 195.

Ma wei to Nantai.—Between Ma wei and Nantai, a distance of 8½ miles, the Min river Conservancy Board have undertaken the improvement of the river by means of training works and dredging. In February, 1934, the Conservancy Board stated that the navigation channel had been dredged to a minimum depth of 17 feet (5m2) at high water neap tides, and 20 feet (6m1) at high water spring tides, over a maximum width of 200 feet (61m0); at such states of the tide vessels with draughts not exceeding 15 feet (4m5) and 18 feet (5m5), respectively, could proceed up to Nantai. The depths in a restricted area of the anchorage off Nantai were from 13 to 18 feet (4m0 to 5m5); there are four mooring buoys for steam vessels in this area, and vessels must secure bow and stern. Several buoys have been placed to mark the passage between the mooring berths.

Owing to continual silting, it is possible that the depths mentioned above may not be always maintained. In 1936, the dimensions of the largest vessel berthing at Nantai pontoons were: length 270 feet (83m2), beam 41 feet (12m5), draught 20 feet (6m1).

Foochow.—The city of Foochow, situated about 2 miles northward of the northern bank of the river, is built on a plain inside an amphitheatre of hills and is surrounded by walls; there are suburbs between the city and the river. The Europeans mostly reside on the northern side of Nantai island, on the southern side of the river, which is connected to the northern side by a stone bridge. A British Consul resides at Foochow.

There is a W/T station at Foochow, *see* page 42.

Epidemics of measles and cholera occasionally break out among the native population at Foochow, and are generally caused by close crowding and bad water.

Charts 1761, 2412, 1262.

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CHAPTER IV.

FORMOSA STRAIT.—PESCADORES ISLANDS.—NORTH COAST OF LUZON.—LUZON STRAIT.—FORMOSA.

Chart 1968.

FORMOSA STRAIT.—Formosa strait is the wide passage bounded westward by the coast of China between Breaker point (page 63) and the entrance to the Min kiang, and eastward by the west coast of Formosa (pages 161—178); the Pescadores islands, separated from the west coast of Formosa by Pescadores channel, lie on the eastern side of the strait. Except for Formosa banks, lying in the middle of the southern part of Formosa strait, and the dangers adjacent to the China coast, the strait is deep.

Chart 2661b.

Banks and reef southward of Formosa strait.—Vereker banks.—Vereker banks, in the southern approach to Formosa strait and about 112 miles south-south-westward of Breaker point, are two dead coral banks with deep water between and around them; South Vereker bank has a least depth of 32 fathoms (58^{m}5), and North Vereker bank has a least depth of 35 fathoms (64^{m}0). There are heavy overfalls and tide rips in their vicinity.

A sounding of 32 fathoms (58^{m}5) was obtained by the U.S.S. Solace, in 1900, about 37 miles south-westward of South Vereker bank, in approximately Lat. 20° 40′ N., Long. 115° 18′ E.

In February the prevailing current sets between west-north-west and west-south-west in the vicinity of Vereker banks, with a rate of from a half to one knot; at times it sets to windward, and with calms or light south-westerly winds it sets between south-south-east and east-south-east, at a rate of from a quarter to one knot.

Chart 362.

Pratas island and reef.—Pratas island (*Lat. 20° 42′ N., Long. 116° 43′ E.*), about 136 miles southward of Breaker point, lies on the western side of a circular coral reef enclosing a lagoon. The island is covered with scrubby bush, and is about 40 feet (12^{m}2) high to the top of the vegetation; in the hazy weather which prevails in this locality during the north-east monsoon, the island is seldom visible beyond a distance of 5 or 6 miles, and the breakers at the edge of the reef may possibly not be seen until within a distance of one mile. The island is composed of sand, and has a shallow inlet on its western side, which affords shelter to the Chinese fishermen who come here in the early part of the year. There is a settlement on the north-eastern side of the island. Sea birds are numerous in the breeding season.

Chart 1263.

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Chart 362.

Pratas reef is from one to two miles wide; the southern, eastern, and northern sides, as well as a portion around Pratas island, just dry at low water and are steep-to along the greater part of their outer edges. Two channels give access to the lagoon, one on either side of Pratas island; many coral knolls, in addition to those shown on the chart, are believed to exist in these channels and in the lagoon. South channel is by far the better of the two channels into the lagoon, as it is wider, a little deeper, and is comparatively free from coral knolls; this channel is believed to be available for vessels with a draught of 15 feet (4m6). A white sand spit, which breaks with a westerly swell, lies on the northern side of this channel and about 2 miles southward of the western extremity of Pratas island. North channel is about 2½ miles northward of Pratas island, and it appears possible to carry a depth of from 1½ to 2 fathoms (2m3 to 3m7) through, but there are numerous coral heads, some with a depth of only 2 feet (0m6).

The wreck of a steam vessel, with one funnel and two masts, standing upright on the south-eastern edge of Pratas reef, was conspicuous from the southward in 1934. The fore part of a vessel, about 40 feet (12m2) in height, standing up-ended on the north-eastern edge of the reef was a conspicuous object in 1926.

Anchorages.—Directions.—Although Pratas reef is steep-to in most parts, there are several spots where, in case of necessity, a vessel might find anchorage outside the breakers, particularly on the western side, abreast the middle of North and South channels. A vessel of light draught might even anchor in safety on the reef in the middle of South channel, in a depth of 3½ fathoms (6m4), or cross it and take up a berth inside the lagoon in depths of from 4 to 10 fathoms (7m3 to 18m3), fine sand.

During the strength of the monsoons vessels should always endeavour to pass to leeward of Pratas reef, on account of the invariable set of the current to leeward; soundings give no warning of a vessel's approach to it, and the weather is frequently thick and hazy in this vicinity. The safest quarter to make the reef from is the western, as the island is on this side, and the currents run in a north-east or south-west direction, according to the prevailing monsoon; approaching the reef a vessel should be conned from aloft, as with the sun in a favourable position the bottom can be seen in a depth of 10 fathoms (18m3).

Pratas reef, lying in the route between Manila and Hong Kong, is a serious danger to vessels using that route, especially in the north-east monsoon, when strong gales and thick clouds are sometimes prevalent for weeks together.

Currents.—Tide rips.—At distances of from 20 to 50 miles north-westward to north-eastward, through north, of Pratas reef, during the times of various searches being made for reported shoals, the currents in the neighbourhood were found to be exceptionally strong, and tide-rips were frequently observed, which occasionally appeared like breakers. On one occasion, in 1889, Captain the Hon. F. C. P. Vereker reported that, on the night of 22nd March: "Breakers were distinctly heard, with regular intervals between the breaks, and altering course I steered towards them, sounding carefully. There was a fair amount of moonlight, and I was nearly convinced we had discovered the shoal until I obtained a sounding of 202 fathoms

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Chart 362.

(369m4), muddy bottom, in the centre of the breakers, and found it was a small but heavy tide rip travelling north-westward."

Chart 2661b.

Breakers reported.—In 1937 breakers were reported about 160 miles east-south-eastward of Pratas island, in approximately Lat. 20° 07′ N., Long. 119° 28′ E.

Chart 1968.

Formosa banks.—Formosa banks cover a wide area in the middle of the southern entrance to Formosa strait, and have general depths of from 5 to 15 fathoms (9m1 to 27m4) over them; the shoalest known patch, 4½ fathoms (8m2) lies about 111 miles eastward of Breaker point. The shoalest spots on the banks appear to be steep-to, and heavy overfalls generally indicate these sudden changes in depth. Fish in large shoals have been seen on the banks in April and May.

Great caution should be observed when approaching the banks, as from the character of the soundings and the heavy overfalls, it is probable that the depths in places may be less than are indicated on the chart.

During April and May the current generally sets north-eastward at a rate of one knot, becoming more rapid as Formosa is approached.

Chart 1961.

PESCADORES ISLANDS.—The Pescadores or Hōko retto, lying off the west coast of Formosa, consist of many islands and numerous rocks. The geological formation of these islands is mainly a mixture of basalt and sandstone, with outcrops of quartz on the extreme western shores. The islands are generally flat, no part exceeding an elevation of 260 feet (79m2), and, as they are very similar in appearance, it is difficult to identify any of them in bad weather; there are no trees.

The Pescadores are divided into two main groups, separated by a channel named Hattō Suidō. The largest islands, Hoko tō, Gyoō tō, and Hakusa tō, are contained in the northern group; these three islands form a fortified area (*see* Caution on pages 51, 52), and between them is the extensive and excellent harbour Hōko kō. The islands in the southern group are mostly of a reddish colour.

The climate resembles that of the southern parts of Formosa; frost and snow never occur in winter. Though rain seldom falls, unlike the southern parts of Formosa, the summer is humid and sultry. As the islands are not sufficiently high to afford protection, the wind is always felt strongly; however calm the early part of the day may be, a wind is practically certain to arise after noon, generally north-north-east from October to April, and southerly from May to September.

Dai sho.—Dai sho (Daisho tō), the southernmost island of the Pescadores, rises to its highest summit, 213 feet (64m9), in the south-eastern part, and when seen from northward or southward appears wedge-shaped; this island is well cultivated, and had a population of 3,716 in 1930.

Pii Abei (Moyankyan), the north-west point of the island, is a low tongue of land fringed by a reef about 2 cables wide, with depths of less than 3 fathoms (5m5); the outer edge of this reef is steep-to, and there are always whirlpools off it. Chinese junks find good shelter

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Chart 1961.

off the northern side of Pii Abei during the summer months. A bank, with depths of from 5½ to 10 fathoms (10m1 to 18m3), extends about 2 miles in a northerly direction from a position about 1½ miles northward of Pii Abei; tide rips always occur on this bank.

Karō shi (*Lat. 23° 11′ N., Long. 119° 26′ E.*), the south point of the island, is a pointed headland; a rock, with a depth of 3 fathoms (5m5), lies 2 cables southward of this point, and there are always tide rips around it. There is foul ground off the coast for about three-quarters of a mile north-westward of Karō shi. Kes shō (Kentaa) is a pinnacle rock, with a depth of 2½ fathoms (4m1), lying about three-quarters of a mile north-eastward of Karō shi and about 3 cables offshore; a rocky bank, with depths of from 8 to 10 fathoms (14m6 to 18m3), lies about one mile east-north-eastward of Karō shi.

Chō ki (Ta kyaa taa), the north-east point of the island, is a steep, conspicuous cliff about 200 feet (61m0) high; shoal water extends for about half a mile eastward of Chō ki, terminating in a steep-to rock, with a depth of 5½ fathoms (10m1).

Byō sho and Sō sho.—Byō sho (Daibyō sho) about 8 miles north-westward of Pii Abei, is a conspicuous dome-shaped island 256 feet (78m0) high. Sō sho is a flat island 59 feet (18m0) high, lying with its north point about 9 cables eastward of Byō sho, to which it is almost connected by reefs, leaving only a passage for boats; a reef extends about three-quarters of a mile south-south-eastward from Sō sho, and on its outer end is a small rock 14 feet (4m3) high. The depths are irregular for fully 1½ miles southward of Byō sho and Sō sho.

Ka sho.—Ka sho, about 4½ miles northward of Byō sho, is mainly composed of quartz, and is thus fairly easy to indentify from a distance; the island is irregular in appearance, and its highest hill is 164 feet (50m0) high. A small bay on the north-east coast of the island affords shelter from southerly winds to small craft with local knowledge. A village, with a population of about 500 in 1930, is situated on the south coast; there is but little cultivation.

A reef, awash at its outer end, extends about 1½ cables from the south-east point of Ka sho, and a reef extends about 3 cables from the south-west point of the island. A sandy spit, with general depths of from 7 to 10 fathoms (12m8 to 18m3), extends nearly 2 miles from the south coast; these depths decrease abruptly to 3 fathoms (5m5) about 2 cables offshore.

Shō rettō.—Shō rettō is a group consisting of two islands, one islet and a number of rocks. Tō sho hei sho, the southern island, lies about 4 miles north-eastward of the north-east point of Dai sho and is 197 feet (60m0) high; there are sandy beaches on its western and southern sides. A rock, 28 feet (8m5) high, lies 1½ cables off its south-east point, and a shoal, with depths of less than 5 fathoms (9m1), extends about one mile south-eastward from this rock. Cho bō sho (Flat rock), 20 feet (6m1) high, lies about 2 miles south-eastward of the south-east point of Tō sho hei sho; a pinnacle rock, with a depth of 4½ fathoms (7m6), lies about half a mile south-south-eastward of Cho bō sho, and a rock, with a depth of 4 feet (1m2), lies about 4 cables south-westward of Cho bō sho. There are always strong tide rips about here. Shō shi (Peaked rock), a conspicuous square rock 120 feet (36m6) high, lies nearly 1½ miles westward of Cho bō sho, and is steep-to on all sides except the eastern. Nan on shi (Low rock), about

Charts 2409, 1760, 1968, 2661b, 1262.

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Chart 1961.

1¼ miles westward of Shō shi, is a flat, steep-to rock 6 feet (1m8) high. A rock, 82 feet (25m0) high, lies about 6 cables west-north-westward of the south-west point of Tō sho hei sho, with foul ground between. A pinnacle rock, with a depth of 2½ fathoms (4m1), lies fully half a a mile eastward of the north-east point of Tō sho hei sho.

Sei sho hei sho, 148 feet (45m1) high, lies close north-westward of Tō sho hei sho and is connected to it by a sandy ledge; a rock, 76 feet (23m2) high, with two rocky pillars on it, lies about 2 cables off its north-west point.

Tōkin sho (Steeple islet), (*Lat. 23° 17′ N., Long. 119° 30′ E.*), about one mile northward of the north-west point of Sei sho hei sho, is a conspicuous stony islet 157 feet (47m8) high, with some rocks off its southern side. A sandy shoal, with a least depth of 5½ fathoms (10m1) lies about three-quarters of a mile north-westward of Tōkin sho.

Sei kitsu sho and Tō kitsu sho.—Light.—Sei kitsu sho, 98 feet (29m9) high, lies about 5 miles eastward of Tō sho hei sho and has cliffs on its northern side; a village, with a population of about 360 in 1930, is situated on its southern side. Hoku shō, a rock 5 feet (1m5) high, lies about 1½ cables off its north coast. Foul ground extends about three-quarters of a mile eastward from Sei kitsu sho, and Kin taa, a rock which dries one foot (0m3), lies nearly half a mile north-eastward of the north-east point of the island; about 3 cables eastward of Kin taa is a rock with a depth of 3 feet (0m9), and about 3 cables farther eastward is a rock with a depth of 1½ fathoms (2m3).

Tō kitsu sho, about 2½ miles eastward of Sei kitsu sho, is saddle-shaped, with the highest part, 154 feet (46m9), in the north-western part; there are sand dunes on the eastern and western sides, and some rocks lie close offshore. A village, with a population of 900 in 1930, is situated on the western side of the island. An islet, 118 feet (36m0) high, named Sho tō sho, lies about 3 cables off the north-western end of Tō kitsu sho and is connected to it by a reef; a rock, with a depth of 5 fathoms (9m1), lies about 6 cables north-westward of Sho tō sho, and about 3 cables west-south-westward of this rock is a rock with a depth of 5½ fathoms (9m6).

Both Sei kitsu sho and Tō kitsu sho are surrounded by shoal water for a distance of from one to 4 cables; strong tide rips off the salient points are a danger to small craft. The passage between these two islands should not be attempted, as the rocks just described, and strong tide races, render it highly dangerous.

A rocky bank, with a least depth of 11 fathoms (20m1) over it, and on which there are tide rips, lies about 4 miles east-north-eastward of Tō kitsu sho.

A light is exhibited, at an elevation of 177 feet (53m9), from a white circular iron framework tower, 23 feet (7m0) in height, situated on the summit of Tō kitsu sho.

Tōkin suidō.—Dangers.—Tōkin (Tōgun) suidō, between Tōkin sho and Hatto rettō, a group of islands lying northward, is nearly 4 miles wide, but the navigable channel is reduced to half this width by a bank, on which are a number of rocks, extending about 2 miles southward from Hatto rettō; the southern part of the channel is deep, except for the 5½-fathom (10m1) patch lying about three-quarters of a mile north-westward of Tōkin sho.

Charts 2409, 1760, 1968, 2661b, 1262.

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Chart 1961.

Tō kin kō tan (Iwasaki shō), a rock with a depth of 2¾ fathoms (5m0), lies nearly 2 miles northward of Tōkin sho and is the southernmost of the dangers in the northern half of Tōkin suidō. Chū tan, a rock with a depth of less than 6 feet (1m8), lies about 6 cables north-north-eastward of Tō kin kō tan; several sunken rocks lie within a distance of three-quarters of a mile around Chū tan, and this area should be avoided, especially as the tidal streams are irregular.

Hattō rettō.—Anchorages.—This group consists of Hattō tō and Shōgun ō sho (Sō tō), with numerous islets and rocks. The inhabitants live mainly by fishing.

Hattō tō, the main island of the group, attains its greatest elevation in a dome-shaped hill, about 174 feet (53m0) high, on the western side of the island, on the summit of which is a large stone pillar. There are three villages on the island, the principal being Moan, on the southern side, with a population of 1,400 in 1930; Kwataku, on the west coast, has a population of 1,040, and Suian, on the north coast, has a population of about 1,000.

Rō on, a rock 7 feet (2m1) high, lies on a reef extending 6 cables westward from the south-west point of Hattō tō; about 3 cables westward of this reef is another reef, with three rocks on it from 7 to 12 feet (2m1 to 3m7) high. The channel between these two reefs has depths of from 4 to 6 fathoms (7m3 to 11m0), but it should only be used by small vessels with local knowledge. A rock, about 2 feet (0m6) high, lies on a reef extending about half a mile from the west coast of the island. Reefs extend nearly 3 cables from the north coast, and a rock 4 feet (1m2) high, named Senko shō, lies about 4 cables off the north-east point. Baansan sho (Cliff islet) lies about 2 cables off the east coast.

Shōgun ō sho is separated from the east coast of Hattō tō by a narrow passage named Shōgun suidō; the village of Shōgun ō (*Lat. 23° 22′ N., Long. 119° 31′ E.*) is situated on the western side of the island. Reefs, with some rocks above water on them, extend for half a mile in places off the north and south coasts of the island. Senpan sho, the south-east point of the island, is a steep black cliff, 108 feet (32m9) high, and is a very good landmark. Senpan sho on (Tsun unsū taa), about half a mile eastward of Senpan sho, is a rock, 8 feet (2m4) high, surrounded by a reef. A 2-fathom (3m7) patch lies about 7 cables south-eastward of Senpan sho, and a short distance farther in this direction is Kōbaku tan shō (Kōhei shō), a dangerous shoal with a rock, which dries, on its western side. Dai on (Waauntaa), a rock 9 feet (2m7) high, lies about one mile southward of Senpan sho. Vessels should not attempt to pass between Senpan sho on, Kōbaku tan shō, and Dai on, as there are many pinnacle rocks in this vicinity.

Shōgun suido, separating Hattō tō and Shōgun ō sho, is narrow and intricate, and can only be used by small vessels with local knowledge; the tidal streams are rapid. A rock, 7 feet (2m1) high, lies in the southern part of the channel, and between this rock and the reef extending from the western end of Shōgun ō sho the channel is barely three-quarters of a cable wide, with a depth of 3¼ fathoms (5m9).

During the north-east monsoon there is anchorage, in depths of from 6 to 8 fathoms (11m0 to 14m6), sand, off the west coast of Hattō tō, between Rō on and the 2-foot (0m6) high rock about 1¼ miles north-

Chart 1760, 1968, 2661b, 1262.

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Chart 1961.

ward. In the south-west monsoon there is anchorage off the eastern side of Hattō tō, between Baansan sho and Senko shō, in depths of from 9 to 10 fathoms (16m5 to 18m3), sand and mud.

Tidal streams.—In the vicinity of the islands composing the southern group of the Pescadores the tidal streams set northward and southward, the change occurring within one hour after high or low water; the maximum rate is between 3 and 4½ knots, but this is considerably affected by the winds.

Hattō suido.—Hattō suido, the channel separating the northern from the southern group of the Pescadores, is about 5 miles wide, and appears to be deep and free from dangers.

Kosei sho and Toban sho.—Kosei sho, the southernmost island of the northern group of the Pescadores, lies about 5½ miles northward of Hattō tō and is flat-topped and consists of two parts, connected by a low sandy isthmus, so that from a distance northward or southward it appears as two islands; except for the sandy isthmus the coasts of both parts consist of steep cliffs. Gatō bi, the eastern extremity of the island, is a sharp headland with steep cliffs, and is a good landmark. A village, with a population of about 800 in 1930, is situated on the isthmus. A bank, with a least depth of 7 fathoms (12m9) lies about three-quarters of a mile southward of Kosei sho.

Toban sho (Tampoan su) is a flat-topped island lying about one mile northward of Kosei sho. A spit, with depths of from 3 feet (0m9) to 3 fathoms (5m5) over it, extends about 1½ miles north-westward from the island.

Hōko tō.—Hōko tō, the largest island in the Pescadores, lies with its southern extremity about 2¾ miles eastward of Toban sho. Chūton sho and Hakusa tō are connected to the northern side of Hōko tō by a reef, which dries, so that at low water these three islands appear as one.

Risei kaku (*Lat. 23° 33′ N., Long. 119° 41′ E.*) the eastern extremity of Hōko tō, is low and shelving. Saha sho lies about 1½ miles eastward of Risei kaku, with foul ground between, and is a rocky islet 57 feet (17m4) high; Risei shō, a pinnacle rock with a depth of 2 fathoms (3m7) lies about one mile south-eastward of Risei kaku, and a reef, partly awash, lies about one mile southward of the same point. There are whirlpools in this locality, and it must be avoided.

There are two bays on the south-east coast of Hōko tō between Risei kaku and Kō kaku, about 5½ miles south-westward, where anchorage may be obtained during the north-east monsoon; *see* Regulations for Japanese Naval Ports on page 46. There are fishing villages along the shores of these bays. Rinto shō, a rock with a depth of 2½ fathoms (4m6), lies about 2½ miles south-westward of Risei kaku; Kōro sho, a rock 5 feet (1m5) high, with other rocks around, lies about one mile northward of Rinto shō. Between these rocks and the coastal reef extending from the south-western side of Risei kaku there are depths of from 6 to 8 fathoms (11m0 to 14m6), mud and sand, where sheltered anchorage can be obtained in the north-east monsoon, taking care to avoid the telegraph cable; the water is very clear, and the rocks and shoals can be plainly seen from the masthead.

Enchō (Yencho) wan, a bay on the south-western side of Hōko tō, affords excellent anchorage in a depth of about 6 fathoms (11m0); at the head of this bay is a low neck of land, separating it from

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Chart 1961.

Bakō kō (page 144), and the sea sometimes washes over it at high water when there is a wind from seaward. *See* Regulations for Japanese Naval Ports on page 46.

The western side of Hōko tō is described on page 144.

Submarine cable.—A telegraph cable from Hotei, on the west coast of Formosa, is landed on the western side of Risei kaku.

Islets and dangers eastward of Hōko tō.—Light.—Numerous rocks and shoals lie off Hōko tō. Rokushaku shō, the southernmost of these, lies nearly 6 miles south-eastward of Risei kaku and has a depth of 3 feet (0^m9) over it; close off its southern side is a rock with a depth of $4\frac{1}{2}$ fathoms (8^m2). These rocks are steep-to, but they are plainly marked by tide-rips when there is any tidal stream running. Rokushaku shō is covered by a *red* sector of Sabo sho light, between the bearings of 327° and 333°.

Nan shō, with a depth of $2\frac{1}{2}$ fathoms (4^m6), lies about $2\frac{1}{2}$ miles south-south-eastward of Risei kaku, and is the south-western part of a steep-to, rocky reef; there is a depth of $3\frac{1}{4}$ fathoms (6^m9) on the north-eastern end of this reef.

Sabō sho is a group of three small islets lying about 2 miles south-eastward of Risei kaku; the middle and highest islet is composed of stones, with no vegetation, and is 41 feet (12^m5) high.

A light is exhibited, at an elevation of 77 feet (23^m5), from an octagonal tower, 36 feet (11^m0) in height, painted in black and white horizontal bands, on Sabō sho.

Naitan shō (Naikimuta rock), about $4\frac{1}{2}$ miles northward of Sabō sho, has a depth of $1\frac{1}{2}$ fathoms (2^m7) and is steep-to; a pinnacle rock, with a depth of 8 fathoms (15^m6), lies close southward of Naitan shō. Gaitan shō (Kentei gan) lies about three-quarters of a mile eastward of Naitan shō and has a depth of 5 feet (1^m5) over it; there are always strong whirlpools near this rock. Hokutan shō (Pakimuta rock), about $1\frac{1}{2}$ miles north-north-eastward of Naitan shō, has a depth of 7 fathoms (12^m8) over it. There are very irregular depths in this vicinity, and vessels should keep outside the *red* sector of Sabō sho light, between the bearings of 327° and 333°.

Teichō sho (Ragged islet), about $3\frac{1}{4}$ miles northward of Risei kaku and $1\frac{1}{4}$ miles off the eastern side of Hōko tō, is 54 feet (16^m5) high; a rocky ridge extends about half a mile north-westward from the islet. Teichō shō, a partly drying reef marked by breakers, lies about 7 cables north-eastward of Teichō sho. Keisen sho (Tei chō shō) lies about three-quarters of a mile north-westward of Teichō sho, and is a black, rocky islet, 67 feet (20^m4) high, divided into two parts. Keisen shō, about one mile northward of Keisen sho, is a reef which dries; when covered it is always marked by breakers.

Chō sho (*Lat. 23° 40′ N., Long. 119° 39′ E.*), about $2\frac{1}{2}$ miles north-north-westward of Keisen sho, slopes gradually down from its eastern side to a sandy beach at its western end, where there is a village with about 400 inhabitants in 1930; Hakusa sho (Sable islet), situated about one mile northward of Chō sho, is a rock 71 feet (21^m6) high and it lies on the reef surrounding Chō sho. A rock, 9 feet (2^m7) high, lies about half a mile northward of Hakusa sho, and about 7 cables farther northward is a shoal with a depth of $1\frac{1}{2}$ fathoms (3^m2).

Itō shō, with a least depth of $3\frac{1}{4}$ fathoms (5^m9), lies about $2\frac{3}{4}$ miles north-north-eastward of Hakusa sho.

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Chart 1961.

Tidal streams and currents.—In the vicinity of all the rocks and dangers eastward of the northern group of the Pescadores the tidal streams run northward and southward, turning at the times of high and low water, with a maximum rate of 2 knots. This rate is, however, increased by the north-going current through Pescadores channel (page 175); in a position 2¼ miles southward of Sabō sho the north-going stream may attain a rate of 5 knots, whilst the south-going stream may not exceed a rate of 1¼ knots. About 8 miles eastward of Chō sho there is a constant north-going stream; with the north-going tidal stream it attains a rate of 5 knots, whilst the south-going tidal stream the rate is reduced to half a knot.

Gyoō tō.—Dangers.—Gyoō tō is an island lying westward of Hōko tō. Tōbi tō (Shō tō), its south-east point, is a steep cliff 175 feet (53m3) high and forms the western entrance point to Hōko kō. The south coast of the island, between Tōbi tō and Kitsushi bi, about 2¼ miles westward, forms two sandy bays, the eastern named Shōchi wan and the western Gaian wan (Taichi wan); these two bays afford safe anchorage with north-easterly winds. *See* regulations for Japanese Naval Ports on page 46. A pinnacle rock, with a depth of 3½ fathoms (6m4), lies about half a mile southward of Kitsushi bi; there are always strong whirlpools near this rock, so that the southern side of this headland should be given a berth of one mile.

Bitō is a prominent headland about 2¼ miles north-eastward of Kitsushi bi, Bitō shō, a rock awash lying on the outer edge of a reef, lies about half a mile westward of Bitō, and about one mile farther westward is Bitō shū, a bank with a least depth of 5½ fathoms (10m1).

Shōmon sho is an islet lying close off the northern extremity of Gyoō tō; its southern side is a sandy beach and its northern side is a steep cliff. There is a sharp peak, showing a strata of limestone, on the western extremity of the islet, which is thus readily identified from a distance. A reef extends about 6 cables northward from this extremity, and on its northern end is Hokutan hō, a rock with a depth of 6 feet (1m8) over it.

Gyukō wan, immediately northward of Shōmon sho, affords sheltered anchorage to vessels with local knowledge during the north-west monsoon, although the tidal streams may attain a rate of 5 knots; *see* Regulations for Japanese Naval Ports on page 46. The northern entrance to Hōko kō lies between the north-east point of Gyoō tō and the western side of Hakusa tō, but, owing to the reefs extending from either side, this passage is too narrow and intricate to be serviceable.

Byōsho shō (Nyauchūtaa), lying off the entrance to Gyukō wan and about 1¼ miles northward of the west point of Shōmon sho, has a least depth of 1¼ fathoms (2m7) and is steep-to on its western side; there is a safe channel, with depths of over 10 fathoms (18m3), between this shoal and Hokutan hō. Kukaku sho (Kantasū), a rock 10 feet (3m0) high, lies about 2¼ miles northward of the west point of Shōmon sho.

The eastern side of Gyoō tō is described on page 144.

Light.—Fog signal.—A light is exhibited, at an elevation of 203 feet (61m9), from a white circular tower, 33 feet (10m1) in height, situated on Kitsushi bi. A fog signal is sounded from the lighthouse.

Hōko kō.—Hōko kō, between the east coast of Gyoō tō and the

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Chart 1961.

west coasts of Hōko tō and Hakusa tō, affords safe anchorage in the north-east monsoon, whilst Bakō kō, an inner harbour in the south-eastern part, affords safe anchorage under all conditions of weather. *See* regulations for Japanese Naval Ports on page 46.

A reef extends about one mile from the eastern side of the southern entrance, and the outer end, which dries 8 feet (2m4), is named Fuon; Keiro sho (*Lat. 23° 32′ N., Long. 119° 32′ E.*), an island with a rounded top, lies on the middle part of this reef. Shikaku sho, nearly one mile north-north-eastward of Keiro sho and a quarter of a mile offshore, is a flat islet; a steep-to reef extends about 2 cables from its western side.

A shoal, with a least depth of 4¼ fathoms (8m7), lies in the middle of the southern entrance to Hōko kō. Kaikan gan (Black rock), which dries 10 feet (3m0), lies about 1½ miles northward of Shikaku sho. It is safer to pass westward of this rock, as a reef extends a considerable distance form the eastern shore of the harbour here; vessels proceeding eastward of the rock should pass it at a distance of about 2 cables, thereby keeping in about mid-channel between the rock and the coastal reef extending from the western side of Hōko tō.

Northward of Tōbi tō the east coast of Gyoō tō, which forms the western side of Hōko kō, is indented by several small bays. About midway along this coast a reef extends about 3 cables. Chikukō wan, the bay northward of this reef, affords anchorage, in a depth of about 4¼ fathoms (8m2), with Kaikan gan bearing 165°, and the summit of Daisō sho, an islet about 1¾ miles westward of the south point of Hakusa tō, bearing 081°; owing to the reefs extending from the northern shore of the bay, vessels should not anchor northward of this position. A breakwater, about 500 feet (152m4) in length, was under construction in this bay in 1935.

Light.—A light is exhibited, at an elevation of 34 feet (10m4), from a red iron beacon, 25 feet (7m6) in height, on Fuon reef.

Bakō kō.—Bakō kō, entered from the eastern side of Hōko kō, is a secondary naval port, and as such is divided into three areas. No. 3 area includes Hōko kō and the adjacent islands, as shown by the pecked lines on chart 1961, marked "Limits of Naval Port"; No. 2 area is the whole of Bakō kō south-eastward of the pecked line just within the entrance; No. 1 area lies within No. 2 area. For regulations in force at Japanese Naval ports *see* page 46.

The entrance is about 3 cables wide between the reefs on either side, whilst the space within is somewhat restricted by coral reefs extending from the shores; a rock, with a depth of 3¼ fathoms (5m9) over it, lies in the middle of the harbour. There are general depths of from 5½ to 8 fathoms (10m1 to 14m6) in the harbour, so that it can be used by vessels of deep draught. Sabō san, a hill about 142 feet (43m3) high on the peninsula separating Enchō wan from Bakō kō, is the highest land in this neighbourhood and is very conspicuous.

Immediately within the entrance, on the north-eastern side of the harbour, is a bay named Nai kō; the town of Bako kai, fronted by a sea wall and quay, is situated on the northern shore of this bay, and on the southern side of its entrance is Sokuten tō (*Lat. 23° 33′ N., Long. 119° 34′ E.*), where the Naval dockyard is situated. A submarine cable is laid across the entrance of Nai kō.

Light.—Buoys.—A light is exhibited on Sokuten tō.

Charts 1760, 1968, 2661b, 1262.

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Chart 1961.

The shoal water extending from Fukibi kaku, the southern entrance point of Bakō kō, is marked by a conical buoy painted in black and white horizontal bands; a similar buoy marks the shoal extending from the point about 4 cables southward.

Climate.—The north-east monsoon is very strong from the middle of September to the beginning of April; during this period the sky is generally overcast, but very little rain falls. At other times of the year there are only light winds; in summer light southerly winds are frequent and the weather is generally good. Typhoons occur between July and September. Fogs may occur between January and May, and these are most frequent in March, but they are few in comparison with those on the opposite coast of China.

Harbour facilities.—Fowls, pigs and fish are obtainable.

Weather signals are made at Bakō kō.

There is regular steamship communication between Bakō kō and Formosa.

Regulations.—The general regulations for all Japanese Naval ports are given on page 46. The following additional regulations are for Bakō kō:—

Art. 4.—When vessels not attached to the Japanese Navy wish to enter Area 2 they must send in a written request explaining the reason for this, and obtain in advance the permission of the Admiral of the Port. If the reason is that they are carrying cargo for Government use the written request must be approved by the responsible official of the department concerned.

Vessels which have received the permission of the Minister of Marine and other vessels as detailed in another part of these regulations, are not required to carry out the above procedure of a written request.

Art. 10.—When the vessels or small craft referred to in Article 4 wish to move from Areas 1 or 2 they must first inform the Governor of the Port. If the reason for their entering the harbour is the transport of Government stores they must have a certificate from the official concerned.

Art. 11.—When necessary, entry into Areas 1 and 2 may be prohibited to vessels of war and other vessels. In times of necessity the anchorages of vessels of war and other vessels in the port may be changed, or they may be ordered to leave. When the matter is specially urgent the Governor of the Port will give these instructions.

Art. 38.—Vessels of war and merchant vessels, which have been permitted to enter Area 2, if arriving after sunset, should stop and anchor temporarily in Area 3, clear of the fairway, till sunrise. Those vessels which have had their anchorage allocated by the Governor of the Port, and those which enter the area under Article 7, are exempt from this restriction.

Art. 39.—All vessels navigating in Area 2 must proceed at a speed just sufficient to enable them to maintain a safe course.

Art. 40.—Vessels in Area 2 must not proceed in line.

Art. 42.—When two or more vessels of war or other vessels wish to enter Area 2 at the same time, they must follow the order in which their anchorages are allotted, and until the

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Chart 1961.

first vessel has finished anchoring or mooring the other vessels must wait in Area 3. When leaving the appointed anchorage, should there be no fear of danger to the manœuvring of vessels arriving, this restriction does not apply.

Art. 43.—If two or more vessels of war or other vessels are about to leave Area 2 at the same time, the one nearer the entrance must proceed first into Area 3.

Art. 44.—When a vessel is about to enter Area 2, and another vessel is leaving it, the former must stop for the time in Area 3 and wait for the other.

Art. 47.—Merchant vessels, not attached to the Navy, when they are about to enter Area 2, whether they have permission to enter the harbour or not, must await instructions in Area 3 in some position out of the fairway and hoist the signal PR of the International Code of Signals.

Art. 60.—Vessels carrying explosives or substances which easily explode may not enter Area 1 without the permission of the Admiral of the Port.

Art 62.—Within the limits of the port, vessels which come into one or other of the classes given below, must, whether under way or at anchor, hoist flag B of the International Code of Signals at the masthead by day, and at night hoist one *red* light on a position where it is visible all round.

(1). Men-of-war which are carrying explosives or dangerous articles outside the magazines constructed for them.

(2). Vessels actually engaged in embarking or unloading explosives or other dangerous articles.

(3). Merchant vessels or boats carrying explosives or other dangerous articles.

Art. 69.—Vessels and boats having a fire alight on board must keep more than 120 feet to leeward when steaming near vessels which have hoisted flag B of the International Code of Signals.

Art 72.—In these regulations the words infectious diseases apply to: cholera, dysentery, typhus, small-pox, eruptive typhus, scarlet fever, diphtheria, plague, recurrent fever and measles. Should there be other infectious diseases requiring quarantine these regulations also apply.

Art. 74.—No discharge from an infectious person, or any object which may possibly be infected, may be thrown into the water of the port, the docks, or the rivers which flow into it. This applies also to anything which might injure health.

Art. 77.—If cholera, small-pox, or plague breaks out in a Naval vessel in the port, this must be at once reported by signal to the Harbour office; by day, flag Q of the International Code of Signals must be hoisted, at night a *red* light must be shown above a *white* light. All communication must be stopped; a special inspection must be made by a Naval Doctor who will be sent, and the orders of the Admiral of the Port must be awaited.

Art. 81.—Vessels entering the port which have already had on board patients or deaths from cholera, small-pox, or plague, or have left or come via a district where these diseases are prevalent, or have communicated with an infected ship and

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Chart 1961.

have not themselves been disinfected, must, when 3 miles off, hoist flag Q of the International Code of Signals by day, and hoist a *red* light above a *white* one at night. They must anchor temporarily in Area 3, hold no communication, undergo inspection by a medical officer sent from the Harbour office, and await orders from the Admiral of the Port.

Directions.—Vessels bound for Bakō kō from the southward or westward should pass about one mile southward of Kitsushi bi (*Lat. 23° 34′ N., Long. 119° 28′ E.*), and then steer for Bakō kai bearing about 072°; Bakō kai can be easily identified by its castle wall. Shikaku sho and Fukibi kaku can be rounded at a distance of a quarter of a mile. When approaching from this direction care must be taken to avoid the spit extending about 1¼ miles north-westward from Toban sho; the east-going tidal stream in this vicinity may attain a rate of 4 knots.

Vessels bound for Bakō kō from the eastward can round Risei kaku at a safe distance, and then pass between Kosei sho and the south-western end of Hōko tō.

Islands and dangers northward of Hakusa tō.—For nearly 8½ miles northward of Hakusa tō there are numerous coral reefs and shoals, rendering this part of the Pescadores extremely dangerous. *See* views on chart 1961.

Koba shō lies nearly 2½ miles northward of the western end of Hakusa tō, and when seen from a distance of about 5 miles westward it appears as a row of four small islets. The island consists of two hillocks connected by a narrow ridge; the northern hillock has a rugged summit, 54 feet (16^{m}5) high, with a stone monument on it 15 feet (4^{m}6) in height. A reef extends about 3 cables from the western side of Koba shō, and nearly 4 cables north-westward of the north-west point of the island is a rock which dries 6 feet (1^{m}8), A rock, which dries 12 feet (3^{m}7), lies close off the south-west point of the island. Tetsuchin shō, a flat, blackish, rocky islet, 41 feet (12^{m}5) high, lies nearly half a mile eastward of the south point of Koba shō, and about 3 cables northward of this islet are three small rocks, about 3 feet (0^{m}9) high, shaped like human heads and known as San Shōgun.

About midway between Koba shō and the western end of Hakusa tō are two small islets surrounded by a reef. Kokkō, the western islet, is 26 feet (7^{m}9) high; Hakkō, the eastern islet, is 41 feet (12^{m}5) high, and its south-western side, being of white sand, is visible from a considerable distance.

Kitsubai tō lies with its south point about 2½ miles eastward of the north point of Koba shō, and is surrounded by a reef extending about 1½ miles southward and 3½ miles northward from the island. The coasts consist mainly of sand, and there is an isolated hillock on its western extremity, which is the highest part of the island. There is a village named Kitsubai, with a population of about 1,400, on the southern side of the island. There is a narrow passage, with a least depth of 3½ fathoms (5^{m}9) in the fairway, between the reef extending northward from Hakusa tō and that extending southward from Kitsubai tō.

A pinnacle rock, with a depth of 1½ fathoms (2^{m}7), lies nearly 1½ miles north-eastward of the north point of Kitsubai tō, and within a distance of one mile north-westward of this rock are several rocks, with a least depth of 4½ fathoms (8^{m}7).

Charts 2409, 1760, 1968, 2661b, 1262.

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Chart 1961.

Kwa shō, about one mile northward of the north point of Kitsubai tō, is a rocky islet 26 feet (7m9) high, with a fisherman's hut on it. Suitei shō, a rock 3 feet (0m9) high, lies on a partly drying reef about 1½ miles west-south-westward of Kwa shō; Dōyatō, about 1½ miles west-north-westward of Kwa shō, dries 3 feet (0m9). There are many other rocks and reefs in this vicinity.

Mokutō shō (Kita Jima), nearly 2 miles northward of the north point of Kitsubai tō, is a flat islet 51 feet (15m5) high. The reef extending from the northern side of Kitsubai tō continues for fully 1½ miles northward of Mokutō shō (*Lat. 23° 47′ N., Long. 119° 36′ E.*) and this part is named Hokuretsu gan; it has three rocky patches on it. Kanteiya shō (Togyo shō), the southernmost patch, dries 6 feet (1m9); Jikyo shō (Nyoyo shō), the middle patch, is awash; Taikyo shō (Taigyo shō), the northernmost patch, dries about 7 feet (2m1), and is steep-to on its northern side.

Ōkō shō, about 3½ miles westward of Mokutō shō, is partly awash and is marked by breakers; another reef, with a least depth of 2½ fathoms (4m6), lies about half a mile westward of Okō shō. These reefs and Hokuretsu gan are very dangerous.

Light.—A light is exhibited, at an elevation of 159 feet (48m5), from a circular iron tower, 120 feet (36m6) in height, painted black and white in horizontal bands, on Mokutō shō; near the lighthouse is a small house surrounded by a wall.

It has been reported that the visibility of this light is considerably reduced during strong northerly winds, which are laden with dust, or by spray from the sea covering the lantern.

Charts 3804, 3805.

NORTHERN SIDE OF LUZON.—Coast.—Cape Bojeador, the north-western extremity of Luzon, is low near its outer end, but rises gradually to broken ridges, bare of trees, about 2 miles eastward. The northern limit of the cape is a point about 2 miles north-north-eastward of its extremity, consisting of black coral cliffs underworn by the sea, about 50 feet (15m2) high, and covered with grass. There is an indentation in the coral reef close southward of this point where landing can be effected, except during north-westerly winds. Between this indentation and the western extremity of the cape a coral reef extends about 3¾ cables offshore, and there are depths of less than 5 fathoms (9m1) three-quarters of a mile offshore. Detached coral heads and sunken boulders lie half a mile offshore and outside the line of breakers.

Light.—A light (*Lat. 18° 31′ N., Long. 120° 36′ E.*) is exhibited, at an elevation of 386 feet (117m6), from a white octagonal tower with a dwelling attached, on the summit of a conspicuous hill situated about one mile eastward of the northern point of Cape Bojeador.

Cape Bojeador: lighthouse bearing 151°.
(No original).

Bangui bay.—Bangui bay is entered between Negra point, a black rocky point fringed by a narrow reef, 3 miles north-eastward of

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Charts 3804, 3805.

Cape Bojeador lighthouse, and Dialao point, nearly 10 miles north-eastward. A coral ledge extends about 1¾ cables northward from Negra point, and there is a black rock, 4 feet (1m2) high, about half a cable north-eastward of the point. For 2½ miles eastward of Negra point the coast consists of rapidly eroding cliffs, off which there are some boulders, and a group of white rocks lies close off Blanca point, about 1½ miles eastward of Negra point. From the eastern termination of the cliffs as far as Burayok point, about 2¾ miles southward of Dialao point, the coast is low and fringed by a sandy beach.

A detached rocky shoal, with a least depth of 1½ fathoms (2m3), lies about 6½ cables south-westward of Burayok point, and a shoal, with a depth of 5¾ fathoms (10m5), lies about half a mile south-westward of Sugiab point, which is situated about a mile northward of Burayok point.

Dialao point is low, wooded, and fringed by a narrow coral reef and a white sandy beach; it is backed by a conspicuous, reddish-coloured ridge, about 600 feet (182m9) high, running parallel to the coast and almost bare of trees. This is the only reddish-coloured ridge in the vicinity. Anchorage may be obtained by vessels with local knowledge, sheltered from southerly winds, in Bangui bay.

The town of Bangui, situated at the head of Bangui bay, about 2¾ miles southward of Burayok point, is not visible from seaward, being hidden by trees.

The tidal streams off Dialao point are strong, and three are eddies and whirlpools. The flood stream sets westward and the ebb eastward.

Coast.—Light.—Mayraira point, the northern extremity of Luzon, is fringed by a reef which extends from about one to 1½ cables offshore, A rocky spit, with a depth of 1¾ fathoms (3m2) at its outer end, extends about three-quarters of a mile north-eastward from the point; tide-rips occur off this spit.

Between Mayraira point (*Lat. 18° 40′ N., Long. 120° 51′ E.*) and Babatkain point, 11 miles east-south-eastward, is Pasaleng bay, in which there are considerable depths and no sheltered anchorage; the shores are mostly steep, except at the head, and there are no dangers outside a distance of half a mile offshore. The Patapat mountains rise steeply from the south-western shore to an elevation of over 4,000 feet (1219m2) and the Karaballo mountains, which are densely wooded, rise steeply from the eastern shore. About 1½ miles south-eastward of Mayraira point and about a quarter of a mile offshore are the Dos Hermanos, two rocks above water. A 2½-fathom (4m5) patch lies about half a mile northward of Babatkain point, and tide-rips occur in its vicinity. The village of Pasaleng stands at the head of the bay.

Claveria bay is entered between Babatkain point and Centinela point, 3½ miles eastward. About three-quarters of a mile eastward of Babatkain point is Lakai Lakai point, the termination of a small peninsula extending about half a mile northward. The Kabikungan river flows into the eastern part of the bay, and on the western side of its mouth is the town of Claveria, in which there is a conspicuous church. Centinela point, off which tide-rips occur, is 163 feet (49m7) high. Anchorage in the bay may be obtained by vessels with local knowledge, in depths of from 5 to 15 fathoms (9m1 to 27m4), sand, sheltered except during northerly winds.

Charts 2409, 1760, 1968, 2661b, 1263.

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Charts 3804, 3805.

Pata point, about 3½ miles eastward of Centinela point, rises to a knoll, 273 feet (83m2) high, about 3 cables southward. The Pata river flows out at the point.

A light is exhibited, at an elevation of 202 feet (61m6) from a white concrete dwelling situated on Pata point.

Tidal streams.—The tidal streams off the north coast of Luzon during the south-west monsoon follow the general trend of the coast, and there is an eddy stream close offshore.

Coast.—A sandbank, on which the sea breaks heavily in bad weather, extends about a quarter of a mile from the mouths of the Pamplona and Abulug rivers, which flow out about 13½ and 17 miles respectively, south-eastward of Pata point. The coast between Pata point and the mouth of the Abulug river is otherwise free from danger. The villages of Pamplona and Abulug are situated about 2½ and 3 miles, respectively, from the mouths of the rivers of the same name. In 1935, a new outlet to the Abulug river, with a depth of 10 feet (3m0) in its entrance, was reported to have formed close westward of Abulug village, and the old mouth to have nearly closed. Between the old entrance to the Abulug river and the mouth of the Kagayan river, 13 miles south-eastward, the coast is low and sandy.

W/T station.—There is a W/T station at Abulug, *see* page 42.

Kagayan river.—Buoy.—The Kagayan river is the largest in Luzon, and the town of Aparri, on the eastern entrance point, is the principal port in northern Luzon. The channel over the bar at the entrance to the river had, in 1932, a least depth of about 10 feet (3m0), but the depth is continually changing. At times the bar is impassable during the north-east monsoon, when vessels are obliged to seek shelter in Port San Vicente (page 151). Heavy tide-rips occur off the entrance to the river.

Pilotage for the port of Aparri is compulsory. Pilots are always in attendance when it is possible for vessels to enter.

Storm signals are shown at Aparri. There is a W/T station; *see* page 42.

A red conical buoy is moored on the western side of the approach to the entrance to the river, about 1¼ miles north-north-eastward of Linao lighthouse.

The village of Linao (*Lat. 18° 22′ N., Long. 121° 36′ E.*) is situated on the western entrance point of the Kagayan river, and the Linao river flows out close southward of it.

The town of Lallo, situated about 12 miles from the mouth of the river, is the head of navigation for sea-going vessels. At times freshets occur, causing the river to rise rapidly, when precautions should be taken against the strong current and débris brought down with it.

Linao lighthouse.

Light.—A light, named Linao, is exhibited, at an elevation of 36 feet (11m0), from a white cylindrical tower, with a white dwelling attached, situated about three-quarters of a mile west-north-westward of the western entrance point of Kagayan river.

Anchorages.—The best anchorage outside the bay is in a depth of 10 or 12 fathoms (18m3 or 21m9), sand and mud, with Aparri

Charts 2661b, 1263.

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Charts 3804, 3805.

church bearing 180°, and the lighthouse bearing 247° The usual anchorage for vessels after entering the river is in the western channel opposite the town of Aparri. The eastern channel can be entered only by small craft and usually only from upstream.

Coast.—Between Aparri and Batulinao point, nearly 27 miles eastward, the coast is low and bordered by a sandy beach; there are no off-lying dangers.

Palaui island, 1,040 feet (317m0) high, lies close off Nulton point, the north-western and low point of the large promontory which forms the north-eastern extremity of Luzon. The western side of the island is bold, except for a rock awash, which lies one mile northward of Puerto point, a high, wooded bluff forming the southern extremity of the island. A reef, which dries, extends about 1½ miles from the eastern side of the island, with Escucha islet, 60 feet (18m3) high and wooded, and Cent islet, 3½ cables southward of it, lying near the outer edge.

Cape Engaño is the north point of Palaui island, and lying within half a mile north-north-eastward of it are the Dos Hermanos islets. Gran Laja rock is a low rock lying one mile north-eastward of the north-eastern point of Palaui island.

Two rocks, the outer about 20 feet (6m1) high, were reported by the British Barque *Vale of Doon*, in 1898, about 2 miles east-south-eastward of Gran Laja; they were not seen by the U.S.S. *Samar*, in 1900, though that vessel passed several times close to their assigned position. There are several other rocks off the north-east point of Palaui island but this area has not been surveyed.

Cape Engaño lighthouse

Light.—A light is exhibited, at an elevation of 315 feet (96m0), from a grey granite tower, with a dwelling attached, situated on the summit of the hill above Cape Engaño. The lantern is white.

Anchorage.—Directions.—Beacons.—Small vessels with local knowledge may obtain good anchorage in Engaño cove, southward of Cape Engaño, in a depth of 19 fathoms (18m3), protected except from north-westerly and westerly winds. A reef extends about three-quarters of a cable from the southern side of the cove.

Vessels should keep two white beacons, 12 feet (3m7) in height, situated at the head of the cove, in line bearing 116°, and anchor about half a mile from the head of the cove.

Chart 3126, plan of Port San Vicente.

Port San Vicente.—Dangers.—Buoy.—Port San Vicente, between the southern side of Palaui island and the Luzon coast southward of Nulton point, consists of an outer and inner harbour. The outer harbour lies southward of San Vicente island, which lies on a drying reef extending about three-quarters of a mile from the south coast of Palaui island. The inner harbour, a small cove between the north-eastern side of San Vicente island and the southern side of Palaui island, is practically landlocked. The shores of the inner harbour are fringed with reefs which extend from half a cable to about 3½ cables, and near the middle, about 4 cables north-westward of the light-structure eastward of San Vicente island, is a shoal with a depth

Charts 2661b, 1263.

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Chart 3126, plan of Port San Vicente.

of 2¼ fathoms (4m1) over it. The inner harbour is an excellent refuge for small vessels during typhoon weather.

Port San Vicente should only be entered from the south-westward; the north-eastern approach is encumbered with reefs and shoals. Rona islet, 23 feet (7m0) high and wooded, lies near the south-western end of a reef, which dries, in the middle of the fairway, about a mile north-eastward of Morgan point (*Lat. 18° 31′ N., Long. 122° 09′ E.*), the north-eastern entrance point of the inner harbour.

New Orleans point, the south point of San Vincente island, is a conspicuous green bluff; the surrounding reef extends nearly 1½ cables southward from this point, but on the western side of the island a projecting part of the reef extends in a southerly direction to a position about 3 cables south-westward of New Orleans point.

A detached reef, with a depth of 3 feet (0m9), lies a quarter of a mile westward of Nulton point: it is marked on its north-western side by a red conical buoy. The fairway to the inner harbour lies between this buoy and the reef extending about 3½ cables from the eastern side of San Vicente island, and has a least width of 1½ cables abreast the buoy.

Light.—A light is exhibited, at an elevation of 31 feet (9m4), from a white concrete tower, on a white concrete pedestal with a black band, situated on the eastern extremity of the reef extending from the eastern side of San Vicente island.

Anchorages.—Directions.—Anchorage may be obtained in the outer harbour, with Escucha and Rona islets in line, bearing 037°, and Puerto point bearing 277°, in a depth of about 7 fathoms (12m8), mud, but it is exposed to westerly and south-westerly winds.

Small vessels may obtain anchorage in the middle of the inner harbour, in depths of from 4 to 4½ fathoms (7m3 to 8m2), mud.

To approach the outer harbour from the northward a vessel should give the western side of Palaui a fair berth, and pass three-quarters of a mile southward of Puerto point; thence steer eastward until Rona and Escucha islets are in line, when steer for them, which will lead to the anchorage.

To enter the inner harbour from the anchorage recommended in the outer harbour, steer for the light tower, and round its southern and eastern sides at a distance of from three-quarters of a cable to one cable, anchoring about a quarter of a mile north-north-westward of it. The red buoy marking the reef with a depth of 3 feet (0m9) over it westward of Nulton point may be passed close-to on its north-western side.

Between the light tower and Nulton point the tidal streams set north-eastward and south-westward at a rate of from 3 to 4 knots. *Charts 3804, 3805.*

Coast.—From the north-eastern entrance to Port San Vicente to Escarpada point (*Lat. 18° 32′ N., Long. 122° 13′ E.*), the north-eastern extremity of Luzon, the coast is high and is bordered by reefs with detached rocks.

A bank, with depths of from 7 to 10 fathoms (12m8 to 18m3), sand and rock, extends 2 miles northward from Escarpada point; this area, however, has not been surveyed.

Chart 1263.

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Charts 3804, 3805.

LUZON STRAIT.—Luzon strait is the wide area between the north coast of Luzon and the southern extremity of Formosa. It contains two groups of islands, namely, the Babuyan islands and the Batan islands, separated from each other by Balintang channel; the former are separated from the north coast of Luzon by Babuyan channel, and the latter are separated from the southern extremity of Formosa by Bashi channel.

Babuyan channel.—Babuyan channel is about 15 miles wide at its western entrance, between Pata point and Fuga island, and about 20 miles wide at its eastern entrance, between Cape Engaño and Kamigin island; it is entirely free from dangers, and there are great depths throughout the fairway.

During the south-west monsoon the current sets strongly northward in Babuyan channel. A plainly marked tide-rip, the broken water northward of which appeared as a line of breakers, has been observed between Cape Bojeador and Fuga island.

Babuyan islands.—The principal islands of this group are Fuga, Dalupiri, Kamigin, Kalayan, and Babuyan.

Fuga island.—Anchorage.—Fuga island, the south-western island of the group, lies with Pagpasakyan point, its western extremity, about 16 miles north-north-eastward of Pata point. The island is hilly, except in the neighbourhood of Kiking point (*Lat. 18° 53′ N., Long. 121° 29′ E.*), its eastern extremity, where it is low. The depths along the southern side of Fuga are irregular, and temporary anchorage may be obtained here when there is a smooth sea.

Chart 3126, plan of Musa bay.

Musa bay lies between the western extremity of Fuga and Barit and Mabaag islands, situated about 6 cables westward, and has general depths of from 12 to 17 fathoms (21^{m}9 to 31^{m}1) in the centre. The best entrance to the bay is from the southward, between Barit and Fuga, where there is a least depth of 6½ fathoms (11^{m}4) in the fairway. A reef, which partly dries, extends about 2 cables from the south-eastern extremity of Barit and about one cable from the east coast of this island; a similar reef extends from one to 1½ cables from the eastern side of this entrance.

A least depth of 4 fathoms (7^{m}3) can be carried through the northern entrance, between Mabaag and the north-western extremity of Fuga. This entrance is, however, greatly obstructed by a reef, which dries, extending about a quarter of a mile eastward from the eastern side of Mabaag; about one cable eastward of the outer end of this reef is a detached reef, with a rock awash on it, which is marked by breakers. Between this detached reef and the coastal reef extending from the Fuga shore is a passage about 1½ cables wide, with a least depth of 4 fathoms (7^{m}3). The northern entrance should not be used except in case of necessity.

The western entrance to the bay, between Barit and Mabaag islands, has depths of from 10 to 16 fathoms (18^{m}3 to 29^{m}3) in the fairway. Foul ground, with depths of less than 5 fathoms (9^{m}1), extends about 4 cables north-westward of Barit, and a reef extends about 1¾ cables from the north-western end of Mabaag. A 3¾-fathom (6^{m}9) patch lies about 6 cables westward of the north-west point of Mabaag, and there are irregular depths between. A dangerous shoal, with a least depth of 1¾ fathoms (3^{m}2), lies nearly 1½ miles westward of the northern extremity of Barit.

Charts 2661b, 1263.

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Chart 3126, plan of Musa bay.

Musa bay is sheltered from the sea, but the bottom, being of coral rock and hard coarse sand or gravel, affords bad holding ground, and the anchorage has been reported to be unsafe with strong north-easterly winds. The best position is from 4 to 5 cables north-eastward of Barit island, in depths of from 13 to 16 fathoms (23m8 to 29m3), where the bottom is rotten coral and sand; near Fuga the bottom is rocky. The rate of the tidal streams is considerable.

Charts 3804, 3805.

Dalupiri island.—Dalupiri, the westernmost island of the group, lies with its southern extremity about 7¼ miles northward of Mabaag island; it has a level aspect, with a hilly ridge rising to an elevation of 903 feet (275m2) in the southern part. In calm weather anchorage can be obtained off the eastern side of the island, but the holding ground is poor; a 4¾-fathom (8m7) patch lies about one mile eastward of Visita, a hamlet on the east coast nearly 3 miles northward of the south point of the island.

Banoa is a hamlet situated at the head of a small bight on the western side of the southern extremity of Dalupiri island; vessels with local knowledge can obtain anchorage off this hamlet, but there are depths of over 20 fathoms (36m6) half a mile offshore. Landing can be effected about 2 cables south-eastward of the hamlet, where there is a break in the coastal reef.

Irao islet, surrounded by shoals for a distance of about a quarter of a mile, lies about 2 miles south-westward of the southern extremity of Dalupiri.

Kamigin island.—Kamigin island, the south-eastern of the Babuyan islands, lies with Geulous point (*Lat. 18° 49′ N., Long. 121° 51′ E.*), its southern extremity, about 21 miles north-westward of Cape Engaño. The island is mountainous, with its highest peak, 2,603 feet (610m5) high, lying about 3 miles westward of Nagayaman point, the east point of the island; the higher peaks are frequently obscured by clouds. Mount Kamigin, an extinct volcano 2,372 feet (723m0) high, is situated in the southern part of the island; there are deep valleys between this mountain and the lesser peaks around it, so that when first sighted from the southward they appear as separate islands. With the exception of Mount Kamigin and a narrow strip along the north coast, the entire island is wooded. The coasts are fringed by a narrow steep-to coral reef; a number of high rocks lie on or close to the coastal reef extending from the south-eastern side of the island. A conspicuous yellow and red cliff, about 300 feet (91m4) high, southward of Port San Pio Quinto, on the western side of the island, forms a good landmark for this vicinity.

Kamigin bank, with depths of less than 20 fathoms (36m6), extends about 4 miles north-westward from a position about 3½ miles north-westward of the north-west point of Kamigin island; the least depth on this bank is 11 fathoms (20m1), coral, and it is marked by tide-rips.

Chart 3126, plan of Port San Pio Quinto.

Port San Pio Quinto.—Port San Pio Quinto lies between Magasasut point, situated about 4 miles north-north-westward of Geulous point, and Nagpalbosan point, nearly 3¼ miles north-north-eastward. It affords good shelter with north-easterly winds, and it is the only place in the Babuyan islands where a large vessel can lie in tolerable safety, the bottom being less rocky than in Musa bay.

Charts 2661b, 1263.

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Chart 3126, plan of Port San Pio Quinto.

Pamoktan island, with deep water outside a distance of about one cable all round, divides the entrance into two channels. This island is a good landmark when approaching the harbour; from the northward or southward it appears as a single cone, but from the westward it shows two distinct peaks, the northern one being the higher of the two. Pinon islet, with a reef extending about 1½ cables from its northern and southern extremities, lies about 2 cables off Magasasut point, with a clear channel between; a rock, 15 feet (4m6) high, lies about a quarter of a mile southward of the islet.

The southern entrance to the port, between the reef extending from Pinon islet and Pamoktan island, is fully one mile wide, with depths of about 40 fathoms (73m2), decreasing gradually inside. The northern entrance, between Pamoktan island and the reef extending about a quarter of a mile from Nagpalbosan point, is fully three-quarters of a mile wide, but there is a rocky patch, with a least depth of 5¾ fathoms (10m5), which nearly breaks in heavy weather, almost in the middle of the channel; when entering by this channel vessels should pass fairly close to Pamoktan island.

The best anchorage is in the northern part of the port, off the village of Balutubat, in depths of from 8 to 12 fathoms (14m6 to 21m9), sand and broken coral. A shoal, with a least depth of 2¾ fathoms (5m0), lies in the southern part of the port, about 1¾ miles north-eastward off Magasasut point and half a mile offshore. The port is exposed to westerly winds, but some protection can then be obtained by anchoring in deep water close eastward of Pamoktan island.

Charts 3804, 3805.

Rocks north-eastward of Kamigin island.—Ginapak rocks, about 6 miles eastward of Nagayaman point, consist of two rocks like towers, 316 and 215 feet (96m3 and 65m5) high, respectively, with another rock, 20 feet (6m1) high, close northward; foul ground extends northward from the latter rock. A sunken rock, marked by breakers, on which the U.S.S. *Charleston* was wrecked, lies nearly 2 miles northward of the northern Ginapak rock. There is a safe channel between the Ginapak rocks and Kamigin island.

Didikas rocks (*Lat. 19° 05′ N., Long. 122° 12′ E.*), about 8 miles north-eastward of the Ginapak rocks, are a group of three sharp-pointed rocks, 200, 215, and 270 feet (61m0, 65m5, and 82m3) high, respectively, which appear like ships under sail from a distance; with several sunken rocks around they cover an area about three-quarters of a mile wide in a north-east and south-west direction. In April, 1900, clouds of condensed steam were seen issuing from them.

Chart 3804.

Kalayan island.—Off-lying dangers.—Kalayan island lies with Pine point, it southern extremity, about 17 miles east-northeastward of the north point of Dalupiri island. Mount Kalayan, the highest peak, is situated almost in the middle of the island. With the exception of a small cultivated area near the town of Kalayan, situated on the southern side of the island, and Nagsidel and Katanapan points on the western side, the island is densely wooded. The coasts are mostly rocky cliffs, much undermined by the sea, and fringed by a coral reef plainly marked by breakers. Heavy tide-rips are found off the various points, and they should be given a berth of fully one mile when rounding them.

Charts 2661b, 1263.

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Chart 3804

The town of Kalayan is situated about 2¼ miles west-north-westward of Pine point, and near the middle of a sandy beach 4 miles in length; it contains only one stone building. A coral reef, with a rock 8 feet (2m4) high on it, lies about 1¾ miles westward of Pine point and about 6 cables offshore; there is deep water in the fairway of the channel between this reef and the coast. Vessels with local knowledge can obtain anchorage off Kalayan and north-westward of this reef, but there are depths of over 30 fathoms (54m9) about 4 cables offshore; boats can land on the beach fronting the town, but this is dangerous with southerly or south-westerly winds. Small vessels with local knowledge can find partly sheltered anchorage in Kibang cove, on the north-eastern side of Pine point.

Panuitan island lies about 2 miles northward of Batang point, the north east point of Kalayan island, and rises abruptly from the sea on all sides to a long, even ridge, which is slightly higher at the northern end; the top and eastern sides are covered with grass, and the western slope with small bushes. The island is uninhabited, but is frequently visited by the natives of Kalayan island for turtle. A rock, with a depth of less than 6 feet (1m8), lies about a quarter of a mile off the south-eastern side of Panuitan. The coastal reef extends about 1½ cables from the north-eastern side of the island, and there are several pinnacle rocks on it.

Wyllie rocks consist of a large black rock 16 feet (4m9) high, situated about 2½ miles northward of Panuitan island, and two small rocks awash about half a cable north-eastward of the large rock. A bank, with depths of less than 30 fathoms (54m9), extends nearly one mile northward from the large rock, and there are numerous shoals and coral heads on it within half a mile of the rock. Violent tide-rips and whirls occur over this bank even in calm weather, and, owing to the strong and irregular currents, Wyllie rocks should be given a wide berth, especially as this area has not been completely surveyed.

Babuyan island.—Babuyan island, the north-eastern and highest of the group, lies with its southern extremity about 26 miles eastward of Panuitan island, and is generally steep-to and wooded. Mount Pangason (*Lat. 19° 32′ N., Long. 121° 57′ E.*), the highest peak, is situated almost in the middle of the island, and is 3,569 feet (1087m8) high; a peak, 2,835 feet (864m1) high, about half a mile westward of Mount Pangason, is an active volcano. Near the western extremity of the island is a conspicuous cinder cone, 2,253 feet (686m7) high.

The southern extremity of the island is a steep and rocky headland, covered with irregular patches of trees and bushes on its eastern and western sides; a reef extends nearly half a mile south-eastward from this headland, and just within the extremity of this reef is Pan de Azucar, a slender pinnacle rock, 104 feet (31m7) high.

San Dionisio is a small village, with a flagstaff, situated at the mouth of a stream on the south-west coast of the island; there are depths of over 40 fathoms (73m2) half a mile offshore.

Almost the entire east coast of the island consists of cliffs from 200 to 1,400 feet (61m0 to 426m7) high. A reef, with two rocks awash on it, extends about 2 cables from the north point of the island. The best landing place on the island is at Barugan cove, situated on the north coast, but there is no protected anchorage. Heavy tide-rips occur from one to 3 miles off the various points of the island.

Charts 2661b, 1263.

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Chart 3804.

Balintang channel.—Islets and banks.—Balintang channel, between the Babuyan and Batan islands, is free from dangers, and is frequently used by vessels proceeding to China and Manila by eastern routes.

Kalayan bank, with a least depth of 19 fathoms (34m7), lies in the western part of Balintang channel, and extends, with depths of less than 100 fathoms (182m9), for about 12 miles in a north-north-westerly direction from a position about 8 miles northward of Panuitan island; there are heavy tide-rips over this bank.

The Balintang islets are an isolated group lying in the eastern part of Balintang channel; the western islet, which is much larger than the others and has three peaks, lies about 25 miles north-north-eastward of the north point of Babuyan island, and is perforated in a north-east and south-west direction. Within a distance of 6 cables south-eastward of this islet are three islets or rocks, 44, 74, and 117 feet (13m4, 22m6, and 35m7) high, respectively. An islet, 279 feet (85m0) high, lies about one mile eastward of the large islet, and between them is an islet 339 feet (103m3) high. These islets may be passed at a distance of from 2 to 3 miles on either side; in bad weather the sea breaks heavily against them.

Batan islands.—The Batan islands are a chain of islands, mostly high, covering a distance of about 53 miles in a north and south direction. The physical characteristics of the larger islands indicate volcanic origin; the smaller islands are generally low, and are based on coral. Sabtang, Batan, and Itbayat are the three principal islands, and they are well watered by small rivers.

The inhabitants possess many of the characteristics of the native races of Formosa, and their peculiar language increases their exclusiveness; this has been strengthend by the difficulties of intercourse, owing to the strong currents, with Luzon. The chief industry is raising cattle, hogs, horses, and goats, which, owing to their superior quality, are exported in large numbers. The climate of these islands is noted for its salubrity. Batan produces yams, maize, rice, etc. Deer are found on Sabtang and Ibahos, and there are quail on all the islands.

During the north-east monsoon strong winds prevail amongst the islands, and the currents are occasionally rapid. The tidal streams set south-westward during the rising tide, and north-eastward during the falling tide.

Sabtang island.—Anchorage.—Sabtang, the southernmost island of the group, lies with its southern extremity about 42 miles northward of Babuyan island. Sabtang (San Vicente), the principal town, is built of stone and is situated on the north-east coast of the island. Vessels with local knowledge can obtain sheltered anchorage off this town during the south-west monsoon, in depths of from 10 to 12 fathoms (18m3 to 21m9), sand, with the church bearing 225°; on this bearing the depths decrease gradually from 15 fathoms (27m4) about half a mile offshore to about 5 fathoms (9m1) 1¼ cables offshore. The coastal reef extends nearly one cable offshore by the town, but there is a gap in it abreast the church. A shoal, with depths of less than 5 fathoms (9m1), extends about 3 cables north-eastward from the coast at the south-eastern end of the town; a detached shoal, with a depth of 4¼ fathoms (8m7), lies about 4¼ cables east-north-eastward of the church.

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Chart 3804.

Off-lying dangers.—Two rocky ledges lie about 9 cables and 1¼ miles, respectively, northward of Natao point (*Lat. 20° 22′ N., Long. 121° 51′ E.*), the northern extremity of Sabtang island; the northern ledge has a depth of one fathom (1m8) over it, and the southern 1¾ fathoms (3m2). Between the latter and Natao point there is a channel about half a mile wide, with a least depth of 6¾ fathoms (12m3).

Islands westward of Sabtang island.—Ibahos island, about one mile westward of Sabtang island, has a hill on its southern end 297 feet (90m5) high, but is rather low otherwise and is strewn with lava rocks; the coastal reef extends as much as half a mile in places from the eastern side of the island. Sabtang channel, separating Ibahos from Sabtang, is about three-quarters of a mile wide at its narrowest part, between the coastal reefs on either side, and is deep in the fairway. Indifferent anchorage can be obtained by vessels with local knowledge in the northern part of this channel, in a depth of about 10 fathoms (18m3), rocky bottom with sandy patches; the flood tide sets southward with a maximum rate of from 3 to 4 knots, and the ebb tide northward.

Dequey island, about half a mile westward of the northern end of Ibahos island, has a hill on its south-eastern end 202 feet (61m6) high; a strong tide-rip sets northward along its south-western side. Ibahos channel, between Dequey and Ibahos islands, is deep in the fairway; the coastal reef extends about one cable from either side.

Batan island.—Anchorages.—Batan, the most important island of the group, lies with Mavien point, its south-western extremity, nearly 2½ miles north-eastward of Sabtang island. Mount Irada, apparently an old volcano and thickly wooded, is situated in the north-eastern part of the island; the south-western part of the island is over 1,000 feet (304m8) high in places, and there are several broad cultivated places elsewhere.

There are several small towns and villages; Basco, the principal one, is situated on the west coast, about 1½ miles south-south-eastward of Diojo point, the north-west point of the islands, and is built of stone and is conspicuous from seaward. Pilots for the other islands of the group can be obtained here. There is a W/T station at Basco, *see* page 42.

Vessels with local knowledge can obtain anchorage in Baluarte bay, off the town of Basco, in a depth of about 13 fathoms (23m8), fine coral sand; small vessels can anchor closer in, in a depth of 5½ fathoms (10m1), fine sand. The holding ground is good, but this bay only affords protection in the north-east monsoon. The coastal reef, with depths of less than 3 fathoms (5m5), extends fully one cable offshore in places; a detached shoal, with a depth of 3 fathoms (5m5) over it, lies about 1½ miles north-north-eastward of Tamalung point, the south point of the bay.

Vessels with local knowledge can obtain open anchorage off Mahatao, a village on the west coast and nearly 1¾ miles south-south-westward of Tamalung point. A passage has been cut through the coastal reef off the village to admit schooners of 50 tons, which are generally hauled up when they arrive from Manila with the south-west monsoon; large boats can use this passage and ground safely on a sandy beach.

Vessels with local knowledge can obtain temporary anchorage

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Chart 3804.

off San Vicente (*Lat. 20° 23′ N., Long. 121° 55′ E.*), situated about 2½ miles south-south-westward of Mahatao, and the port or landing place for the town of Ivana, about half a mile farther south-south-westward; owing to reefs, however, this anchorage is very confined and is unsafe with northerly winds.

Vessels with local knowledge can obtain anchorage off Uyugan, a village on the south coast nearly 1½ miles eastward of Mabien point, in a depth of about 8 fathoms (14m6), with the church bearing 045°.

Mananioy bay, nearly in the middle of the east coast of Batan, is reported to afford sheltered anchorage with westerly winds, but it is impossible to land anything here, as the shore rises vertically to about 150 feet (45m7). The east coast of Batan is practically uninhabited.

Balugan bay, the next bay northward of Mananioy bay, is reported to afford sheltered anchorage during the south-west monsoon. Desquid point, the southern entrance point of the bay, is a prominent black bluff; there are some high rocks on the coastal reef southward of the point, and foul ground extends for as much as 3 cables offshore between Desquid point and a point nearly one mile south-westward. A detached rock, with a depth of less than 6 feet (1m8), lies about 4 cables south-south-eastward of Desquid point. A pinnacle rock, with a depth of 2 fathoms (3m7) over it, lies about 1½ cables north-eastward of Desquid point.

Tumaruk rock, 127 feet (38m7) high, lies about 2 cables off the north-east coast of Batan island.

Itbayat island.—Itbayat island lies with its southern extremity about 16½ miles north-westward of Rokavato point, the north point of Batan island. Mount Santa Rosa, the highest hill on the island, is situated on the northern end and is 914 feet (278m6) high; Mount Riposet, on the south-eastern side, is 759 feet (231m3) high. The island presents a barren aspect from seaward, but the interior is well cultivated and there are many wooded patches. The coasts are mostly cliffy, with deep water close inshore, so that landing can only be effected in a few places by those with local knowledge; a vessel desiring to communicate with the island can obtain a pilot at Basco, in Batan island.

Diogo island.—Outlying bank.—Diogo island, about 6½ miles eastward of the southern extremity of Itbayat island, is a volcano rising steeply to an elevation of 1,683 feet (513m0); in 1903 the volcano was active, discharging vapour and dark material. The island is surrounded by a coastal reef, extending as much as 3 cables in places, and there are several small islets or rocks around; the outermost of these, 75 feet (22m9) high, lies about half a mile eastward of the south-east point, and a rock, 128 feet (39m0) high, lies about the same distance eastward of the north point of the island.

A bank, with a least depth of 19 fathoms (34m7), lies about 5½ miles south-eastward of Diogo island.

Islands and dangers northward of Itbayat island.—Siayan island lies about 3½ miles north-north-eastward of the north point of Itbayat island; some detached shoals lie within a distance of 3 cables of its southern and south-eastern sides. Mabudis island lies about 1½ miles north-north-eastward of Siayan island, and the passage between them is rendered unsafe by rocks and reefs; a reef, with some

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Chart 3804.

rocks above water on it, extends nearly half a mile north-eastward from the north point of Mabudis.

North island (*Lat. 21° 04′ N., Long. 121° 56′ E.*) lies about 7½ miles northward of Mabudis island. Three rocks, one of them being 135 feet (41m1) high, lie within 2 cables of the eastern side of North island; a rock above water lies close off its west point, and a rock, 6 feet (1m8) high, lies about 2 cables north-eastward of its north point.

A shoal, with a least depth of 5¾ fathoms (10m5), lies about 4½ miles south-westward of North island; this shoal is a narrow ridge of sand lying in about the middle of the south-western side of a bank, with depths of less than 50 fathoms (91m4), about 2 miles long in a north-west and south-east direction, and three-quarters of a mile wide. With the exception of this shoal the passage between Mabudis and North islands is clear. Heavy tide rips occur along the edge of the bank, except at or near slack water. The flood stream sets northward towards the shoal, and the ebb stream east-south-eastward; the maximum rate occurs about 5 hours after the times of high and low water. The north-going stream predominates, but when the moon is near its maximum declination, north or south, the stream setting in an east-south-easterly direction is usually strong, sometimes attaining a rate of 5 knots.

Y'Ami island, about 2 miles north-north-eastward of North island, is the northernmost island of the Batan group. An islet, 232 feet (70m7) high, lies about 3 cables westward of the south point, and another islet lies close off the east point of the island. There is a clear channel between Y'Ami and North islands.

Bashi channel.—Dangers.—Bashi channel, between Y'Ami island and the southern extremity of Formosa, is sometimes used by steam vessels trading between the United States, Japan, and Manila. Shōkōtō sho, about 42 miles eastward of Garan bi, the south point of Formosa, and Kōtō sho, lying on the northern side of Bashi channel, are described on pages, 190, 191, and the light on Garan bi on page 161.

Gadd rock lies about 14 miles southward of Shōkōtō sho and in the fairway of Bashi channel; it is about half a cable in diameter, with a depth of 1½ fathoms (2m7), and from 30 to 40 fathoms (54m9 to 73m2) close around, increasing to over 100 fathoms (182m9) close north-eastward of the rock. At low water the sea probably breaks on Gadd rock, but the vicinity is generally marked by violent tide-rips and whirls, which extend more or less the whole distance to Shichesei seki, about 45 miles westward; as these indications are not always visible, Gadd rock should be given a wide berth on either side.

A bank, marked by heavy overfalls and sometimes by discoloured water, lies southward of Gadd rock; the least known depth on this bank, 49 fathoms (89m6), is about 8 miles northward of the rock.

Shichesei seki, about 8 miles southward of Garan bi, (*Lat. 21° 54′ N., Long. 120° 51′ E.*), is a group of above water and sunken rocks, the highest being 25 feet (7m6) high. The channel between these rocks and Garan bi is safe, but very heavy tide-rips, extending almost the entire distance across it, are often experienced; these tide-rips sometimes resemble the sea breaking on a shoal.

In 1927 the m.s. *Ruhr* reported having observed breakers in a position about 18 miles southward of Shichesei siki.

Charts 2661b, 1263.

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Chart 3804.

FORMOSA OR TAIWAN.—SOUTHERN SIDE.—Garan bi.—Light.—Garan bi (*Lat. 21° 54′ N., Long. 120° 51′ E.*), the south-east point of Formosa, is a low headland densely covered with scrub and fringed with coral reefs. A rock, 36 feet (11m0) high, on which the sea breaks heavily in the north-east monsoon, lies close off the eastern extremity of the headland.

A light is exhibited, at an elevation of 178 feet (54m2), from a white circular stone tower, 59 feet (18m0) in height, situated on Garan bi. A fog signal is sounded from the lighthouse.

Local storm signals are exhibited at Garan bi light-station; *see* page 38.

Nan wan.—Nan wan is entered between Garan bi and a hilly promontory, of which Kokushoku kaku, about 7 miles westward of Garan bi, is the south-eastern extremity The north-eastern side of the bay is hilly, rising to its highest peak in Toasohambō soan (Taisanbō san), 1,071 feet (326m4) high, situated at the head of the bay and nearly 6 miles north-westward of Garan bi lighthouse. The shores of the bay are mostly fringed by coral reefs, and there are some sandy beaches at the head.

Anchorage.—Dangers.—Light.—At the head of Nan wan is Toapanrā (Taihanretsu) byōchi, which is protected from all but southerly winds and is the best anchorage on the southern side of Formosa.

Taifusa, a pinnacle rock with a depth of 4 feet (1m2) over it, lies about 3 miles eastward of Kokushoku kaku and about 6 cables off the north-eastern shore of the anchorage; a 1½-fathom (3m2) patch lies about 1½ cables south-westward of Taifusa, and there are other dangers between Taifusa and the coast northward. Chogūa (Sekigyūshi), nearly 1¼ miles north-westward of Taifusa and 1½ cables offshore, is a rock 12 feet (3m7) high, and foul ground extends about 1½ cables south-eastward from it. A rock, which dries one foot (0m3), lies about half a cable southward of Kokushoku kaku, and a rock, with a depth of less than 6 feet (1m8) over it, lies about one cable north-eastward of this point. Toaroko (Tairōko), nearly 1½ miles north-eastward of Kokushoku kaku and about 4 cables off the western shore of the anchorage, is a rock 8 feet (2m4) high; a rock one foot (0m3) high lies nearly 1½ cables southward of Toaroko, with a submerged rock between. There is foul ground between these two rocks and the western shore of the bay. A rock, with a depth of 3 fathoms (5m5) over it, lies nearly 4 cables north-eastward of Toaroko.

Toapanrā (Taihanretsu) is a small village at the head of the bay and is the base of a whaling company.

A light is exhibited, at an elevation of 34 feet (10m4), from a white mast, 25 feet (7m6) in height, situated on the shore close westward of Toapanrā. This light shows *green* between the bearings of 007° and 059° over the dangers on the western side of the bay, *red* between the bearings of 275° and 325° over the dangers on the eastern side, and *white* in the approach to the anchorage.

Chart 1968.

WESTERN SIDE OF FORMOSA.—Caution.—Almost the entire west coast of Formosa is extending seaward and new shoals are continually arising; this is especially the case between Anpin kō (page 170) and Taian kō (page 176). Vessels navigating along this coast should, therefore, give it a wide berth, bearing in mind that there is always a current setting inshore.

Charts 2661b, 1262.

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Chart 1968.

Tidal streams.—In general, the tidal streams along the west coast of Formosa set northward with the rising tide in the southern part, and southward with the rising tide in the northern part, but the exact position of the meeting point of these two streams, in opposition to each other with the rising tide, has not been determined, although it appears to be somewhere between Rokukō and Kōryu.

Chart 3804.

Coast.—Nyopii tā is situated about three-quarters of a mile westward of Kokushoku kaku and is the south-west point of Formosa; the coast in this vicinity is fringed with coral reefs, and the mountains rise in steep precipices almost directly from the sea. The tidal streams are strong and there are tide races off this promontory.

Hakusha bi, about 1¼ miles north-westward of Nyopii tā, is the northern entrance point of Hakusha kō, a small bay with a white sandy beach, which affords shelter to small craft with local knowledge with offshore winds; a rock, with a depth of 3 fathoms (5^{m}5) over it, lies about half a mile southward of Hakusha bi and 3 cables offshore. On the northern side of Hakusha kō is a hill 407 feet (124^{m}0) high. Jinkoshi, about 3 miles northward of Hakusha bi, is a small cove where boats can land.

Daiheichō (Taiheichō) kaku (*Lat. 22° 02′ N., Long. 120° 41′ E.*) is a rounded, black, cliffy headland situated about 2¾ miles north-north-westward of Jinkoshi, and the coastal range of hills rises here to an elevation of 645 feet (196^{m}6); within this range, and about 2 miles inland, is a flat plain running from north to south, so that Daiheichō appears as an island when seen from the northward. Beyond this plain is a range of mountains rising to an elevation of 2,224 feet (677^{m}9) in Rōbutsu san, a flat summit with three peaks, situated about 6 miles eastward of Daiheichō. Kōshun (Hyontsun), the principal town in the southern part of Formosa, is situated in the plain mentioned above and had a population of 14,404, in 1935.

Kowanshi is a small bay immediately northward of Daiheichō; reefs extend from the shores on either side, leaving an entrance barely half a cable wide leading to a small basin, with depths of from one to 5 fathoms (1^{m}8 to 9^{m}1), which affords anchorage for small craft with local knowledge, Kisan, a dome-shaped hill 241 feet (73^{m}5) high, is situated on the northern side of Kowanshi.

Shajō hakuchi.—This roadstead fronts a level tract of land, with a sandy beach, between Kisan and Shajō kaku, nearly 2 miles northward; Shajō kaku is a sandy point, covered with grass, and fringed by a coral reef which extends about 1½ cables westward and is usually marked by surf. There are depths of from 6 to 7 fathoms (11^{m}0 to 12^{m}8) about half a mile offshore, shoaling gradually towards the land; the bottom is sandy in general, mixed here and there with mud. The anchorage is entirely exposed to westerly winds, but affords shelter from winds between north-east and south, through east. Boats can land on the sandy beach, but as there is usually a heavy surf caution must be exercised.

The Horyoku kei flows out immediately northward of Kisan, and the Shajō kei flows out about half a mile farther northward; these two rivers bring down a considerable amount of silt when in flood. The village of Shajō is situated on the northern bank of the Shajō kei and about 4 cables up this river.

Charts 1968, 2661b, 1262.

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Chart 3804.

Kaikō wan.—Dangers.—Lights.—Kaikō wan is entered between Shajō kaku and a point about 1¾ miles north-north-eastward, on which is a hill 414 feet (126^{m}2) high, named Sensan. The southern side of the bay is low, but about 2 miles east-north-eastward of Shajō kaku is the southern end of a range of mountains which extends for about 6 miles in a northerly direction from this position. Riiryon soan, the summit of this range, is 3,500 feet (1066^{m}8) high and is situated about 3¼ miles north-north-eastward of Sensan; it is thickly wooded, shaped like a nipple, and is an excellent landmark when not obscured by clouds. Buntaku san, about 2½ miles southward of Riiryon san, is a conspicuous, sharp peak 2,322 feet (707^{m}7) high.

Reefs extend about 3 cables north-westward and northward from Shajō kaku, so this point should be given a wide berth when entering the bay. Suikō sha, a reef with a least depth of 3 feet (0^{m}9), lies nearly midway between Shajō kaku and Sensan, and a detached reef, with a depth of 3¾ fathoms (6^{m}9) over it, lies close off its northern end; there is a clear passage between these two reefs and the head of the bay and also between Suikō sha and the reefs extending from Shajō kaku.

The village of Kaikō (*Lat. 22° 05′ N., Long. 120° 42′ E.*) is situated in the south-eastern corner of the bay, and off the village is a fishing harbour formed by a breakwater on the western side and a sea wall on the eastern side, the basin thus enclosed having a depth of 8 feet (2^{m}4).

A light is exhibited, at an elevation of 45 feet (13^{m}7), from a white square concrete tower, 40 feet (12^{m}2) in height, situated on the extremity of the breakwater. A white square concrete tower surmounted by a diamond, 41 feet (12^{m}5) in height, known as beacon "A", stands on the slopes of the hills 4 cables east-south-eastward of the light-tower; these two towers in line, bearing 112°, lead between the reefs extending from Shajō kaku and Suikō sha.

A red square concrete tower with a triangular topmark, 26 feet (7^{m}9) in height, stands on a hillock about a quarter of a mile within Shajō kaku and is known as beacon "B." There is anchorage, in a depth of about 4½ fathoms (8^{m}2), approaching on the leading mark just given, and anchoring when beacon "B" bears 202°. At night the reefs extending from Shajō kaku and Suikō sha are covered by *red* sectors of Kaikō light between the bearings of 063° and 090°, and 133° and 170°, respectively; the channel between these reefs is covered by a *white* sector.

Coast.—Anchorage.—The village of Fūkō is situated about 5 miles northward of Sensan and on the southern side of the mouth of the Fūkō kei, which is too small even for boats to enter; the hills around are densely wooded. The villages of Raitōkyaku and Bōzan are situated on the southern and northern sides, respectively of the mouth of the Bōzan kei, which flows into the sea about 4½ miles northward of Fūkō; this river rises in the central range of mountains and has usually but little water in it, but after a fall of rain it becomes a raging torrent. The hills along the whole of this part of the coast rise abruptly from the sea, but about 3 miles northward of Bōzan the coast turns north-westward at the foot of a mountain 1,759 feet (536^{m}1) high, whilst the mountains continue northward, leaving a broad plain between them and the sea.

Charts 1968, 2661b, 1262.

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Chart 1968.

The Sotsubō kei flows out about 5½ miles north-north-westward of Bōzan, but its entrance dries in winter. A concrete bridge over the entrance to this river is conspicuous.

Bōryō (Panryō) is a small town situated on the coast about 7 miles north-north-westward of Bōzan. The anchorage off the town affords the best shelter, for vessels with local knowledge, on the west coast of Formosa except that off Takao, and even in winter it is possible to remain here in safety. A few provisions are obtainable. The town is unhealthy, and dysentry, malaria, and beri-beri are prevalent.

Shin ta kō is a shallow boat harbour just within the mouth of the Rinpen kei; its narrow entrance lies about 5 miles north-westward of Bōryō, but even at high water only small boats can enter.

Charts 3804, 1968.

Off-lying island.—Light.—Ryūkyū sho (Shōryūkyu tō) is a small island lying about 11½ miles westward of Bōryō; it has two flat-topped hills on its south-eastern side, the north-eastern, 291 feet (88m7) high, being slightly the higher of the two. In 1930 the population of the island was 4,624, most of them being occupied with fishing or agriculture.

There is a sandy beach about half a mile long in the middle of the south-east coast of the island, and temporary anchorage can be obtained here by vessels with local knowledge, in a depth of 20 fathoms (36m6), sand, about 3½ cables offshore. There is a bight on the north-western side of the island, but the depths are too great for anchoring; there is a landing place for boats here near a white house. A rock, 26 feet (7m9) high, resembling a mushroom, lies close off the north point of the island, and is conspicuous when seen from the eastward or westward. There is a sandy beach at the north-eastern extremity of the island. Shoal water extends from the north-eastern end of Ryūkyū sho, and this end of the island should be given a berth of one mile.

A light is exhibited, at an elevation of 288 feet (87m8), from a white circular concrete tower, 33 feet (10m1) in height, on the south-eastern side of Ryūkyū sho (*Lat. 22° 20′ N., Long. 120° 22′ E.*).

There is a remarkable depression in the bed of the sea between Ryūkyū sho and the coast of Formosa northward; this deep area is a gully, from a half to one mile wide, running first in an easterly direction from seaward and then turning northward towards the coast near Tōkō. In one part of it, about 2½ miles northward of Ryūkyū sho, no bottom has been found at nearly 350 fathoms (640m1).

Tidal streams.—Between Ryūkyū sho and the Formosa coast northward the tidal streams appear to set south-eastward with the rising tide, and north-westward with the falling tide, the maximum rate varying from one to 2 knots. Off the west coast of Ryūkyū sho, however, the tidal stream has been frequently observed setting northward with the rising tide, but the surface stream and the stream near the bottom run in contrary directions; although at times these two may run in the same direction, the rate of the stream near the bottom is generally double that of the surface stream.

Off the south-western and north-eastern extremities of Ryūkyū sho the tidal streams are strong, attaining a rate of from 2 to 3 knots and causing tide rips. There are also tide rips immediately southward of the deep area previously described.

Charts 2661b, 1262.

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Chart 1968.

Tōkō.—The Tōkō kei has its source in the central mountain range of Formosa, runs in a southerly direction through a fertile plain, and flows into the sea about 10½ miles north-westward of Bōryō; the mouth of this river is the harbour of Tōkō, but its importance is gradually waning and the number of large Chinese junks using it is decreasing. Earth and sand brought down by the rush of water from the Tōkō kei, in addition to that from the Shimo Tansui kei, which flows out nearly one mile north-westward, has gradually accumulated and obstructs the passage of shipping. There is a depth of barely one foot (0m3) on the bar; about 3 cables offshore the depths increase suddenly, and within the space of half a mile the depths increase from 10 fathoms (18m3) to over 50 fathoms (91m4).

Owing to the considerable depths off the mouth of the Tōkō kei vessels must anchor southward of the entrance. The best position is in a depth of about 5½ fathoms (10m1), with Nampei sorin, a black wood with trees about 40 feet (12m2) high, situated on the coast nearly 1¾ miles south-eastward of the mouth of the river, bearing 090°, distant nearly 1¼ miles. With Nampei sorin bearing between 078° and 100°, distant from one to 1½ miles, there are depths of from 5 to 7 fathoms (9m1 to 12m8), and shelter can be obtained with north-easterly winds all over this area. The tidal streams in this anchorage are, however, very irregular, and vessels are liable to foul their anchors; they have a maximum rate of about one knot.

The town of Tōkō is situated on the southern bank of the river and just within the entrance. The landing place is below the bridge at the southern end of the town, and boats can land here at any state of the tide. There is a local storm signal station in the town, *see* page 38.

Coast.—Senbi bi is a low, sandy spit about 2¼ miles westward of the mouth of the Tōkō kei; shoal water extends about 3 cables southward from this spit, and there are generally breakers.

Hōbi tō (*Lat. 22° 30′ N., Long. 120° 21′ E.*) is a rocky point, 80 feet (24m4) high, situated about 3 miles north-westward of Senbi bi, and there is a small rock, 2 feet (0m6) high, close off the point. Hōbi tō rises north-eastward to a hill named Hōzan, 478 feet (145m7) high, situated about 1½ miles inland and shaped like the head of a bulrush: a conspicuous saddle-shaped hill 258 feet (78m6) high, named Hōkai san, lies between Hōbi tō and Hōzan, and resembles two factory chimneys when seen from the northward or south-eastward.

Chart 2409.

From a position about 1¾ miles north-westward of Hōbi tō a narrow strip of sand, on which are bushes and fishermen's huts, extends about 6½ miles in a north-westerly direction and encloses a lagoon. A conspicuous chimney, 140 feet (42m6) high, stands inland from the south-eastern end of the lagoon.

Chart 2376, plan of Takao kō.

TAKAO KŌ.—Takao kō, situated at the north-western end of the lagoon described above, is an open port and is the only good harbour in the southern part of Formosa; it can now safely accommodate 16 vessels up to 8,000 tons. There is a considerable trade in sugar, fruit, and cement. For Regulations for Open Ports in Formosa, *see* page 46.

Charts 2661b, 1262.

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Chart 2376, plan of Takao hō.

Kigo yama is the north-western extremity of the narrow strip of sand which forms the south-western side of the lagoon, and its seaward side is composed of precipitous cliffs. The entrance to the Inner harbour lies between the northern extremity of Kigo yama and a low point about half a cable northward, and is protected from seaward by two breakwaters, the outer ends of which were still under construction in 1936; the southern breakwater extends in a north-westerly direction from under an old fort on Kigo yama, and the northern breakwater extends in a south-westerly direction from the coast nearly half a mile northward of the northern entrance point. *See* views facing this page. Kotobuki yama (Takao san), situated nearly 1½ miles northward of the entrance to the inner harbour, is a useful landmark, and is described on page 170.

Lights.—Buoys.—A light is exhibited, at an elevation of 190 feet (57m9), from a white octagonal brick tower, 36 feet (11m0) in height, situated on the northern and highest part of Kigo yama. There is a tower close to this lighthouse. *See* view facing this page.

A light is exhibited, at an elevation of 58 feet (17m7), from a wooden mast, 23 feet (7m0) in height, on the northern side of the harbour entrance (*Lat. 22° 37′ N., Long 120° 15′ E.*).

A light is exhibited, at an elevation of 38 feet (11m6), from a red iron column, 31 feet (9m4) in height, on the head of the breakwater extending from Kigo yama.

A conical light-buoy, painted black, and a conical light-buoy, painted red, are moored about 6 cables north-westward of the entrance to the Inner harbour and mark the channel between the extremities of the breakwaters under construction. The northern of these two light-buoys, No. 1, exhibits a *green flashing* light *every four seconds*; the southern light-buoy, No. 2, exhibits a *red flashing* light *every four seconds*.

On account of dredging operations there are several beacons, from which lights are exhibited at night, near the harbour entrance.

Caution.—In 1935 the depths had decreased about a quarter of a mile west-south westward of the light on the southern breakwater, and there was then a depth of only about 5 fathoms (9m1) in this position.

Inner harbour.—The Inner harbour of Takao lies at the northern end of the lagoon described on page 165, and, when the harbour works are completed, it is anticipated that it will accommodate 20 vessels up to 10,000 tons at one time. In 1936 the Inner harbour had been dredged to depths of from 3¾ to 4¾ fathoms (6m9 to 8m7) for about 1¼ miles east-south-eastward of the entrance, with a width of about 3 cables. Quays, connected with the railway, have been constructed along the northern side of this area, and within the wharves is a basin for small vessels, with depths of from 4 feet (1m2) to 4½ fathoms (8m2). There is also a basin for fishing craft about 2 cables within the northern entrance point of the harbour.

The land on the southern side of the entrance to the Inner harbour, close south-eastward of Kigo yama, has been reclaimed, and some piers have been constructed.

There are a number of mooring buoys in the harbour, the positions of which can best be seen on the chart; three of them are for vessels

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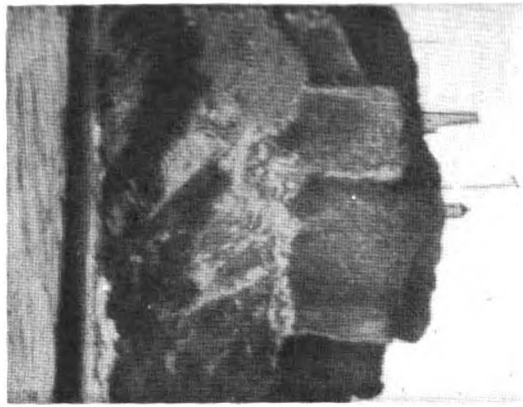
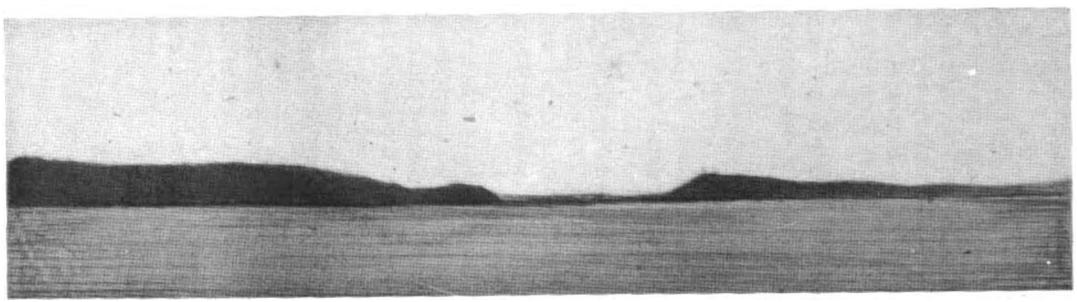
To face page 166.



Kigo yama lighthouse, bearing 290°, three quarters of a cable.



Entrance. *Kigo yama lt. ho. 130°, 6 cables.* *Breakwater.*

Takao kō from north-westward.

(Originals dated 1921).

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Chart 2376, plan of Takao kō.

of 10,000 tons, six for vessels of 3,000 tons, and the remainder are for the use of vessels proceeding alongside or warping off.

The Harbour office, a conspicuous grey building with two domes, is situated on the western side of the basin for fishing craft. There is a landing place opposite the Harbour office, and also immediately westward of No. 1 berth.

Pilots.—The Pilotage area and harbour limits of Takao kō are within a radius of 2 miles from Takao lighthouse. Vessels should not attempt to enter without a pilot.

Tidal streams.—The tides are very irregular at Takao kō, and often there is only one tide a day. At the harbour entrance the tidal stream on the rising tide sets into the harbour, and that on the falling tide runs out, both turning at the times of high and low water and attaining a rate of from 2 to 3 knots. Outside the harbour the tidal stream sets southward with the rising tide, and northward with the falling tide, both being weak and irregular.

The best time to enter the harbour is at the end of the flood stream.

Submarine cables.—Two submarine cables are laid across the harbour, just within the entrance.

Harbour regulations.—The following are extracts from the Regulations for Takao kō :—

Vessels proceeding into port will receive, whilst in the Outer harbour, instructions from the Harbour master as to their berth.

Vessels wishing to proceed into the Inner harbour must hoist their National flag and their code signal letters, sound a long and a short blast on their whistles or sirens, and await instructions from the Harbour master. When a vessel has had her berth allotted she must hoist the flag denoting her berth in acknowledgement, and haul it down immediately after securing.

Vessels arriving at the port after sunset must anchor temporarily in the Outer harbour till sunrise. This does not apply to mail steamers or other vessels which have received the Harbour master's permission.

A vessel which is about to leave the Inner harbour must hoist her National flag, signal letters, and the flag of her berth 20 minutes before sailing. Immediately before weighing anchor she must sound one long and one short blast on her whistle or siren and await instructions from the Harbour master.

Vessels must not pass through the entrance channel or navigate in the Inner harbour before sunrise or after sunset, unless permission has been obtained from the Harbour Master.

Signals.—The following signals are made to vessels entering or leaving the harbour from the signal station at the entrance and the signal station in the Inner harbour :

When entering harbour : The vessel's name will be hoisted at the masthead ; a red diamond shape, showing that permission has been granted, will be hoisted at the northern yardarm, and the berthing signal will be hoisted at the southern yardarm.

When leaving harbour : The vessel's name will be hoisted at the masthead ; a black triangular shape, showing that permission has been granted, will be hoisted at the southern yardarm, and the signal denoting the berth will be hoisted at the northern yardarm.

When the warning flag (a red flag with a white vertical stripe) is hoisted at the entrance signal station only those vessels which have

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Chart 2376, plan of Takao kō.

received permission to enter or depart may navigate in the entrance channel or its vicinity.

The berthing signals, made by flags of the International Code of Signals, are as follows:—

Flag A below a black ball .. Secure at No. 1 berth at the quays.
" B " " " " " " 2 " " "
" C " " " " " " 3 " " "
and so on to
" J " " " " " " 10 " " "

Flag A above the answering pendant .. Secure stern to No. 1 buoy, bows down harbour.
" B " " " " .. Secure to Nos. 1 and 2 buoys.
" C " " " " .. Secure to Nos. 2 and 3 buoys.
" D " " " " .. Secure to Nos. 3 and 4 buoys.
" E " " " " .. Secure to Nos. 4 and 5 buoys.
" F " " " " .. Secure to Nos. 5 and 6 buoys.
" G " " " " .. Secure stern to No. 6 buoy, bows up harbour.
" H " " " " .. Secure to No. 7 buoy, bows down harbour.
" I " " " " .. Secure to Nos. 7 and 8 buoys.
" J " " " " .. Secure stern to No. 8 buoy, bows up harbour.
" K " " " " .. Secure stern to No. 9 buoy, bows down harbour.
" L " " " " .. Secure to Nos. 9 and 10 buoys.
" M " " " " .. Secure to Nos. 10 and 11 buoys.
" N " " " " .. Secure to Nos. 11 and 12 buoys.
" O " " " " .. Secure to Nos. 12 and 13 buoys.
" P " " " " .. Secure to Nos. 13 and 14 buoys.
" Q " " " " .. Secure stern to No. 14 buoy, bows up harbour.
" R " " " " . Secure stern to No. 15 buoy, bows down harbour.

The following special signals are made by flags of the International Code of Signals:—

Flag A below the Harbour master's flag Anchor as convenient clear of the fairway.
" B " " " " .. Stay where you are till further orders.

Charts 2409, 1968, 2661b, 1262.

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Chart 2376, plan of Takao kō.

Flag C below the Harbour master's flag — You will be examined in the Inner harbour; proceed.

„ D „ „ „ „ .. — Delay proceeding into the Inner harbour.

„ E „ „ „ „ .. — A vessel is coming from the Outer harbour; anchor clear of the fairway.

„ F „ „ „ „ .. — A vessel is coming from the Inner harbour; anchor clear of the fairway.

„ G „ „ „ „ .. — You are obstructing the fairway or progress of the works; shift berth as quickly as possible.

„ H „ „ „ „ — There is no room or berth free in the Inner harbour.

„ I „ „ „ „ .. — Your signal is not understood.

„ J „ „ „ „ .. — Cancel the previous signal

The Harbour master's flag is a red flag with a white square in the middle of both the upper and lower edges.

The following tide signals are made from the top of the signal station at the entrance to the harbour:—

By day:

A blue flag denotes 6 inches above mean sea level.
A white flag „ one foot „ „ „
A red flag „ 2 feet „ „ „

At night:

A *blue* light denotes 6 inches above mean sea level.
A *white* light „ one foot „ „ „
A *red* light „ 2 feet „ „ „

Other heights of the tide will be denoted by hoisting the flags together, thus:—If the height above mean sea level is 2 feet 6 ins. the red and blue flags will be hoisted together; if it is 3 feet 6 ins. the red, white, and blue flags will be hoisted together.

Public fairway.—The public fairway in Takao kō is the area defined as follows:—

(*a*) Between a line drawn 108° from a position about 5¾ cables 300° from Takao lighthouse, and a line drawn 108° from a position about 5½ cables 290° from the same lighthouse.

(*b*) Between a line drawn about 5½ cables 096° from the entrance signal station and a parallel line 2 cables southward of the former.

Harbour facilities.—Only a moderate stock of coal is kept. Fuel oil can be supplied to vessels alongside, and a vessel with an oil tank of 50 tons supplies vessels at the mooring buoys.

Fresh provisions are obtainable. There is a good water supply, and there are two water boats.

Small repairs to vessels can be executed. There is a small dock for vessels of light draught on the eastern end of the southern side of the basin.

There is a fixed electric crane, with a lifting capacity of 15 tons, and two of 2 tons capacity; there is also a 5-ton travelling crane, and a 30-ton floating crane.

Charts 2409, 1968, 2661b, 1262.

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Chart 2376, plan of Takao kō.

There are several tugs.

Takao is the southern terminus of the railway on the western side of Formosa. There is regular steamer communication with Japan, with the principal ports in China, also with Batavia, Surabaya, and Macassar, and with other ports in Formosa.

There is a Government hospital which can accommodate a small number of patients.

Local storm signals are displayed at a signal station close westward of the Harbour office (*Lat. 22° 37′ N., Long. 120° 16′ E.*), *see* page 38.

Trade.—Shipping.—The principal exports are sugar, rice, canned fruits, cement, and cotton goods; imports are timber, barley, iron, etc.

In 1931, 937 steam vessels totalling 1,624,465 tons and 1,593 sailing vessels totalling 11,464 tons entered the port.

Town.—The town of Takao is situated on flat ground on the northern side of the Inner harbour. In 1935 the population was 85,459.

COAST.—Danger.—Kotobuki yama (Takao san), nearly 1½ miles northward of the entrance to Takao kō and nearly half a mile inland, is composed of coral and has a crater-like summit; on northerly bearings it appears like a truncated cone, and there is a large white patch on its seaward side. In clear weather it can be seen from a distance of 35 miles, when it appears like an island, and it is the best landmark in this locality.

Ryder rock, which dries one foot (0^{m}3), lies westward of Takao san and about 1½ cables offshore.

Chart 2409.

The coast between Kotobuki yama and Anpin, about 22 miles northward, is an almost straight sandy beach, through which four small streams flow, but they are only navigable by boats. Close within this beach are lagoons or marshes, separated from the sea by narrow sandbars, which in places are thickly covered with shrubs and grass; these sandbars are populated by fishermen, whose rafts, hauled up in rows on the beach, form a characteristic feature of this coast. The mainland itself is low, flat, and marshy, but is cultivated. *See* view on chart 2409.

Poanpen san (Whaleback), about 4 miles north-eastward of Kotobuki yama, is 780 feet (237^{m}7) high. Shōkō san, nearly 7½ miles northward of Poanpen san, has a flat summit, and Daikō san (Toakan soan), about 1½ miles farther northward, is conical and lies at the southern end of a long range of flat-topped hills; these two hills are generally visible when the mountains in the interior are obscured. Ruitei san (Coast Table) is a flat-topped hill about 7 miles northward of Kotobuki yama and about one mile inland.

Anpin kō.—Anpin kō consists of an inner bay, which has now almost entirely silted up and dries over the greater part, and an open roadstead in the approach to the bay. During the height of the north-east monsoon, from December to March, there is smooth, sheltered anchorage, in a depth of about 5 fathoms (9^{m}1), with Anpin light-house bearing between 039° and 059°. During the remainder of the year, however, when south-westerly winds prevail, the anchorage is untenable at times, and communication with the shore is entirely suspended.

Anpin, which formerly had a considerable trade, is now a part

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Chart 2409.

of Tainan shi, which is situated close eastward and is the oldest town in Formosa; in 1935 the population was 110,837. The country around is very fertile.

Anpin (*Lat. 23° 00′ N., Long. 120° 09′ E.*) is reached from the anchorage by a narrow channel, with a depth of about 3 feet (0m9), leading over the bar at the entrance to the inner bay; this channel is constantly shifting, and is marked by three *red* and three *green* lights. The natives maintain communication between the shore and vessels at anchor by a kind of bamboo raft known as "Teppai", which provide a handy means of communication, under skilful management, when conditions are too bad for the employment of other craft.

There is a stone wharf at the north-western end of Anpin, where junks and small craft can lie alongside. Anpin is connected with Tainan by an artificial canal with a depth of 6 feet (1m8).

See Regulations for Open Ports in Formosa on page 46.

Lights.—Beacons.—A light is exhibited, at an elevation of 77 feet (23m5), from a white circular brick tower, 17 feet (5m2) in height, situated near the middle of the town of Anpin. The lighthouse is not conspicuous; as it is partially obscured by trees and houses.

A light is exhibited, at an elevation of 26 feet (7m9), from a white triangular wooden structure, 22 feet (6m7) in height, situated on Shisō ko, a sandy island on the northern side of the entrance to the inner bay, and about 2¼ miles west-north-westward of Anpin lighthouse.

Three beacons have been erected to mark the anchorage at Anpin kō. Beacon "A" stands about half a mile west-south-westward of Anpin lighthouse; Beacon "B" is about 1¾ miles north-westward of Anpin lighthouse, and Beacon "C" is about a quarter of a mile southward of Beacon "B". There is good anchorage, in a depth of about 5 fathoms (9m1), with Beacons "B" and "C" in line, bearing 011°, and Beacon "A" bearing 072°. A chimney, 94 feet (28m7) in height, situated near the western end of the town of Anpin, is conspicuous; a large black chimney with a white band, and a white house near it, situated about 6 miles south-eastward of Anpin lighthouse, is also reported to be a good landmark. *See* caution on page 161.

Harbour facilities.—Shipping.—Fresh provisions are obtainable.

Tainan shi is connected to the railway on the western side of Formosa. There is no regular steamship communication. There is a W/T station at Tainan, *see* page 42.

Local storm signals are displayed at Anpin, *see* page 38.

In 1931, 351 steam vessels totalling 691,788 tons, and 1,144 sailing vessels of 6,610 tons, entered the port.

Coast.—The coast between Anpin and Kaikō, about 42 miles northward, is a sandy beach which dries out for a considerable distance in places, and within the beach is a level plain, intersected by numerous small steams; the seaward edge of the beach is fringed by sand cays, mostly narrow and from 2 to 10 feet (0m6 to 3m0) high. *See* caution on page 161. Owing to the absence of landmarks, it is difficult to fix a vessel's position off this coast.

The Sōbun kei flows into the sea about 6 miles north-westward of Anpin, and is about 2 cables wide at its mouth, which lies between sand dunes; the southern branch of this river, named Rokujimun

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Chart 2409.

kei (Kokushin-mung), enters the sea along the northern side of Shisō ko. Between the mouth of the Rokujimun kei and that of the Sōbun kei is a sand dune named Kairyō, which has numerous fishermen's huts on it and a conspicuous dark wood at its northern end; Dojō su, a sandbank with a lest depth of 4 feet (1m2) over it, which breaks heavily with southerly winds, extends about 1½ miles westward from Kairyō.

Nanpeigaku is a sand cay on the northern side of the entrance to the Sōbun kei. The entrance to the Kokoshōkō kei (Kokushin kan), the outlet of several streams which unite and form a channel through the sandbanks fronting the coast, lies between Nanpeigaku and the south-eastern end of Chūgō, a narrow sand cay about a quarter of a mile north-westward; the masts of numerous junks are usually to be seen in this locality. Strong westerly or southerly winds produce such a high sea that it is impossible for boats to enter the Kokoshōkō kei. A small sand cay, surrounded by a sandbank which dries, lies about three-quarters of a mile southward of Chūgō.

Koryō (Oryo) is a narrow sand cay, 10 feet (3m0) high, lying with its southern end about 2 cables north-westward from the north-western end of Chūgō; another narrow sand cay lies about 4 cables southward of Koryō, and a sandy spit, which dries, extends about a mile southward from the former. Toahyan tai is a sandy shoal, with a least depth of 2¾ fathoms (5m0) over it, lying about one mile westward of the southern end of Koryō, and is the outermost danger in this vicinity; on the outer side of this shoal the tidal streams set northward with the rising tide, at a maximum rate of about 2 knots, and southward with the falling tide, the streams turning at the time of high and low water at the entrance to the Kokoshōkō kei.

Monkō sen (Monkausoa) is a narrow sandy cay, 5 feet (1m5) high, lying with its southern end about 3½ cables northward of the northern end of Koryō. Seikonshin (*Lat. 23° 11′ N., Long. 120° 05′ E.*), an islet inhabited by fishermen and a frequent place of call for small junks, lies about 1¼ miles south-eastward of the northern extremity of Monkō sen. In 1936 portions of the flats within Koryō and Monkō sen were being reclaimed, and reservoirs were under construction. Karyō (Uryo) is a narrow sand cay lying with its southern extremity about 2 cables northward of the northern end of Monkō sen.

The Shōgun kei has its outlet between the northern end of Karyō and the southern end of Shōseiryō, another sand cay nearly one mile northward; junks proceed up this river to load salt. There is a small fishing village on both the north and south banks of this river, near the mouth.

Ōya kō (Onya kan) is a junk harbour in the lower reaches of the Kyūsui kei, which has its outlet between Shōseiryō and Kaisen su, a long, narrow sand cay about 1¼ miles northward; this harbour can only be entered with smooth water. The town of Hokumon (Pakumensutsun), situated on the mainland about 1½ miles eastward of the northern end of Shōseiryō, is the most prosperous place along this part of the coast; large quantities of salt are manufactured here.

Hotei kō (Chiyen kan) is a small harbour about 6 miles northward of Ōya kō and off the town of Hotei (Potei); the harbour entrance faces northward, and there are long, narrow sand cays on each side. The harbour is difficult to enter when the monsoon is strong. The

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Chart 2409.

least depth in the channel leading to the town is barely one foot (0m3). Hotei had a population of over 4,900 in 1931; there are two submarine telegraph cables to Hōko tō, in the Pescadores, and vessels are warned not to anchor in their vicinity. Local storm signals are displayed on the western side of the town.

Off-lying shoals.—Katsuragi su, about 9 miles south-westward of Hotei, is a sandbank with a least depth of 3¼ fathoms (5m9) over it.

Gaikei (Gahia), about 7 miles westward of Hotei, is a narrow sandbank with a least depth of 4 feet (1m2), on which the sea usually breaks. Naikō (Raikau), about midway between Gaikei and the entrance to Hotei kō, is a sandbank with a least depth of 2¼ fathoms (4m1); there is shoal water northward of Naikō, and a few patches with depths of less than 3 fathoms (5m5).

Directions.—Vessels proceeding to Hotei kō from the westward and passing through Pescadores channel must take care not to be set on to Rokushaku shō (page 142) by the north-going current and the tidal streams; course may then be shaped to pass midway between Katsuragi su and Gaikei. Vessels can safely approach up to a distance of 2 miles of the coast near Hotei.

There are few landmarks in this vicinity by which a vessel can fix her position, and due consideration must be paid to the effect of the currents and tidal streams; it must be recognised that navigation at night is very difficult. If the visibility is poor owing to rain, fog, or mist, the change in the colour of the water generally gives some indication of the change in depth.

Tōseki kō.—Tōseki (Tanchaukan) is situated about 4½ miles northward of Hotei and on the northern side of the mouth of the Bokushi kei, and has a small export trade. A narrow channel, entered from the southward, leads between sandbanks to the anchorage off the town, but only junks with a draught of less than 6 feet (1m8) can enter. Local storm signals are displayed at Tōseki (*Lat. 23° 27′ N., Long. 120° 09′ E.*), *see* page 38.

A white circular water tower, 115 feet (35m0) in height, is situated about 5½ miles eastward of Tōseki, and is conspicuous from seaward.

Coast.—Dangers.—Light.—Onkō (Onkan) tai is a large bank extending about 10 miles in a south-south-westerly direction from the coast about 11 miles northward of Tōseki; the inner part is composed of mud, and the outer part of sand, and the greater part of it dries. On this bank are four sand cays: Gaisanchō su (Pinboisoa), on the western side of the southern portion, is about 12 feet (3m7) high; shoal water extends southward from Gaisanchō su, almost as far as Gaikei, with Sien akan (Shiyen-akan), having a depth of barely one foot (0m3) over it, lying nearly midway between. Sankyakushōshi sen, a bank lying with its northern end about one mile eastward of the southern end of Gaisanchō su, was above water, but in 1931 it was reported that it had been washed away. Hakushiryō sen, about one mile eastward of the northern end of Gaisanchō su, consists of two sand cays about 4 feet (1m2) high. Tosen su (Gwasowan) lies on the western side of the northern part of Onkō tai, and is about 22 feet (6m7) high.

A light is exhibited, at an elevation of 53 feet (16m2), from a black iron framework structure, 48 feet (14m6) in height, situated on Gaisanchō su.

Charts 1760, 1968, 2661b, 1262.

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Chart 2409.

Onkō is a narrow, shoal creek lying between the eastern side of the southern end of Onkō tai and the sandbanks extending from the mainland eastward, and it affords anchorage for junks and small craft; the village of Shinkō (Shinkan), where local storm signal are displayed, is situated on the main coast abreast the head of the creek.

Onkō senrai (Onkan sendan) is a sandbank, with a least depth of one fathom (1m8) over it, lying about 1¼ miles south-westward of the southern extremity of Gaisanchō su; it is marked by breakers during the south-west monsoon. Gairyōshi (Goaren-a) is another sandbank, with a least depth of 1¾ fathoms (3m2) over it, lying with its southern end about 2¼ miles westward of the northern end of Gaisanchō su. Both these sandbanks are steep-to on their western sides, and they form the most dangerous part of the eastern side of Pescadores channel.

Kaikō hakuchi.—Kaikō (Haipo) hakuchi lies off the mouth of the Kyūkōbi kei, which flows into the sea about 15 miles northward of Tōseki by a mud point named Gaijō kaku, which is situated about 13 miles north-north-eastward of the light-structure on Gaisanchō su; it is the only roadstead off the central part of the west coast of Formosa which has not deteriorated owing to the silt brought down from the rivers during floods. The coast for nearly 5 miles southward of Gaijō kaku consists of sand hills from 15 to 25 feet (4m6 to 7m6) high. Sandbanks, which dry, extend about 3 miles from the coast northward of Gaijō kaku, and shelter the anchorage from the north-eastward; Sasaki shima, a sandy islet about 5 feet (1m5) high, with some fishermen's huts on it, is situated near the outer edge of three sandbanks and about 3 miles northward of Gaijō kaku.

A shoal, with a least depth of 2¾ fathoms (5m0) over it, lies about 3 miles westward of Gaijō kaku and forms a natural breakwater to vessels lying inside it. During the north-east monsoon there is good anchorage here, in depths of from 4 to 5 fathoms (7m3 to 9m1), mud, with Gaijō kaku bearing about 066°. Caution is necessary when approaching the anchorage, as in recent years the banks and shoals have extended southward.

Kaikō (Haipotsutsun) is a village on the mainland about three-quarters of a mile eastward of Gaijō kaku.

PESCADORES CHANNEL OR HŌKO SUIDŌ.—This channel separates the Pescadores islands (page 137) from the west coast of Formosa, and is deep in the fairway. Rokushaku shō (*Lat. 23° 29′ N., Long. 119° 45′ E.*) and several other dangers lie on the western side of the northern part of the channel, eastward of Hōko tō; these have been described on page 142. The principal dangers on the eastern side are Onko senrai and Gairyōshi (*see* above). The utmost caution must be exercised at all times when navigating this channel.

The coast on the eastern side of Pescadores channel, in the vicinity of Hotei, consists of sand hills dotted with low trees and houses, with no conspicuous landmarks, and even in clear weather the land cannot be distinguished from a distance of more than 10 miles; owing to the dust which accompanies the winds peculiar to this locality, objects on shore become obscured, and at times the land cannot be seen even at a distance of 5 miles.

Charts 1760, 1968, 2661b, 1262.

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Chart 2409.

With strong winds or a heavy sea the shoals on the eastern side of the channel are generally indicated by breakers, but in calm weather they are not easy to discern owing to the muddy colour of the water. Vessels making use of this channel should always keep in depths of over 20 fathoms (36^{m}6); on the eastern side the depths decrease very rapidly within that depth. In the neighbourhood of Hotei the bottom consists of fine sand covered with a layer of mud several inches deep. When the tidal streams are strong, or there is a heavy sea, the areas in which the depths are less than 10 fathoms (18^{m}3) become yellowish and muddy, whilst those of greater depth are a mixture of yellowish muddy colour and light blue water; in depths of over 30 fathoms (54^{m}9) the water is of a deep indigo colour.

Tidal streams and currents.—According to observations carried out during the summer in Pescadores channel, the tidal streams set northward with the rising tide, that is in the same direction as the Kuro shio, and southward with the falling tide; the north-going stream may thus attain a considerable rate, whilst the south-going stream is sometimes imperceptible. The rate of the Kuro shio is considerably increased by continuous south-westerly winds, and is reduced by north-easterly winds; consequently, after a spell of south-westerly winds the north-going stream at spring tides may attain a maximum rate of about 5 knots.

On the western side of the channel the tidal streams change about one hour after the times of high and low water at Hotei. On the eastern side, at a position about one mile westward of Gairyōshi, the north-going stream during summer changes over to the south-going stream at 2 hours after high water at Hotei; although the maximum rate of the north-going stream is about 4½ knots, that of the south-going stream is very weak.

In the middle of the channel the current only is apparent, setting northward at a maximum rate of from 2 to 4 knots; in the northern part of the channel, and outside a distance of from 7 to 8 miles offshore, this rate is only from 1 to 2 knots. Between 3 to 4 miles offshore and 7 to 8 miles offshore the surface movement of the water is compounded of both the current and the tidal streams. On the western side of the channel, northward of Rokushaku shō, the tidal streams are felt up to a distance of from 5 to 6 miles offshore; southward of Rokushaku shō they are in evidence westward of the line joining this rock and Tō kitsu sho.

According to various reports, during the winter when strong north-north-easterly winds occur, there is frequently a strong drift setting southward, but this does not appear to be felt southward of Tō kitsu sho.

Chart 1760.

COAST.—The coast between Gaijō kaku (*Lat. 23° 42′ N., Long. 120° 10′ E.*) and Taian kō, about 46 miles north-north-eastward, is low, with sand dunes and small hillocks, so that there are few noticeable landmarks; near Kaikō there are no hills within 20 miles of the coast, but proceeding northward they gradually approach it to within 3 or 4 miles. The central mountain range of Formosa, with peaks over 10,000 feet (3048^{m}0) high, can only be seen in the forenoons during fine weather. The whole of this coast is fringed by drying mud and sand flats, which extend as much as 3 miles in places, and

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Chart 1760.

they should be approached with the utmost caution, particularly as the tidal streams are strong.

The Seira (Sairi) kei flows into the sea about 9 miles northward of Gaijō kaku, but the channel across the flats leading to its entrance is so exposed that even junks do not anchor here. Bamboo platforms, which are fairly good marks, have been erected here and there along the coast between Kaikō and the mouth of the Seira kei.

Shazan is a small town situated on the coast about 5 miles north-north-eastward of the mouth of the Seira kei; a channel across the mud flat, with the opening south-westward, leads to the town. A detached shoal, with a least depth of 2½ fathoms (4^{m}1) over it, lies about 2½ miles westward of Shazan.

The Dakusui (Taatu) kei, the longest river in Formosa, flows into the sea about 6 miles north-north-eastward of Shazan; although the entrance to this river is about one mile broad, it is impossible for even small boats at high water to pass over the flats off its mouth.

Rokukō gai (Rokan) is situated about 4 miles north-eastward of the mouth of the Dakusui kei, and had a population of 39,823 in 1935; trade is carried on by junks with Amoy and Foochow. Local storm signals are displayed from a mast at the north-western end of the town. Hakkei san, a hill 760 feet (231^{m}6) high, is situated about 8 miles eastward of the town. Banks of mud and sand, which dry, extend about 2½ miles offshore, and outside these is the roadstead.

Tokatsukutsu (Tokatsukuru) is a village situated about 9 miles north-north-eastward of Rokukō gai and on the northern side of the entrance to the Taito kei; the entrance to the river is blocked by silt. The Taito kei rises in the central mountains of Formosa and is about 50 miles in length; although it is half a mile broad in places, it is only navigable by small boats up to a distance of about 10 miles from the mouth. Vessels lying at anchor off the coastal bank communicate with the shore by means of bamboo rafts. Local storm signals are displayed at Tokatsukutsu. A black chimney situated about 5 miles south-south-eastward of Tokatsukutsu, and a black chimney, with a white house close to it, situated about 4 miles north-eastward of this village are conspicuous.

Gosei (*Lat. 24° 15′ N., Long. 120° 31′ E.*) is a village at the mouth of a river about 4 miles north-north-eastward of Tokatsukutsu; landing is difficult here on account of the surf.

The Taian kei flows into the sea about 8 miles northward of Gosei, and Taian kō is a junk anchorage off its mouth. The coastal bank dries out to about half a mile here, and there is a channel across it indicated by stakes; about one mile offshore the depths increase rapidly to between 5 and 8 fathoms (9^{m}1 to 14^{m}6). The village of Taian is situated on the southern side of the mouth of the river; Taikō (Taikaa) is a large town about 3 miles south-eastward of Taian. It is situated between two conspicuous hills; the southern, named Hō san, is 581 feet (177^{m}1) high, and its southern face is reddish in colour; the northern, named Tetsuchin san, is a thickly wooded, square hill, 768 feet (234^{m}1) high.

Off-lying shoals.—Outlying banks.—The depths outside the drying coastal bank between Shazan and Taian are very irregular, and numerous shoals lie within a distance of 2 miles outside the edge of this bank; passing vessels should keep in depths of not less than 10 fathoms (18^{m}3).

Charts 1968, 2661b, 1262.

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Chart 1760.

A sounding of 10 fathoms (18m3), sand and mud, has been obtained about 38 miles westward of Rokukō, and the same depth was obtained about 3½ miles north-north-westward of this position by the Japanese warship *Manchu* in 1917; a similar depth was obtained about 9 miles farther north-north-westward by H.M.S. *Saracen* in 1854.

Tidal streams and currents.—Near Taian kō the tidal streams set northward with the rising tide, and southward with the falling tide; in summer, however, owing to the sea current, there is a constant north-going stream, with a maximum rate of about 2 knots with the rising tide, and one knot with the falling tide.

Off Tokatukutu there is a north-going stream, but no south-going stream is apparent. Off Rokukō the south-going stream is noticeable, but its rate is less than half that of the north-going stream; proceeding southward the rate of the south-going stream increases, attaining the same rate as the north-going stream, though neither has been observed to exceed 4 knots.

Coast.—Between Taian kō and the mouth of the Tsūshō kei, about 7 miles north-eastward, is a level plain through which several small rivers flow. Kaen (Hoyen) san, a rocky peak, rises at the back of this plain and about 7 miles eastward of Taian, and from this peak a range of mountains and hills extends northward to the sea; Sirubiya san (Mount Sylvia), nearly 30 miles eastward of Kaen san, has a pointed summit and is very conspicuous (chart 1968). Kotō san, a hill 303 feet (92m3) high resembling the head of a tiger, is situated about one miles north-eastward of the mouth of the Tsūshō kei; Tsūshō, a village with a population of about 1,000 in 1931, is situated on the southern slope of Kotō san and about half a mile up the river. The Tsūshō kei can be entered by junks at high water.

From Kotō san a range of hills runs along the coast to the southern entrance point of the Kōryu kei, situated about 7 miles northward.

Chart 3658.

Kōryū hakuchi.—Danger.—Kōryū hakuchi, off the mouth of the Kōryū kei, affords open anchorage in depths of from 4 to 8 fathoms (7m3 to 14m6). Piatau san, an isolated hill 305 feet (93m0) high, situated on the southern side of the mouth of the river, is fairly conspicuous. A reef, with a depth of 2¾ fathoms (5m0) over it, lies about 2½ miles northward of Piatau san and 7 cables offshore.

The entire mouth of the Kōryū kei is occupied by a sandbank, which dries 9 feet (2m7), but junks can easily enter at high water; posts are erected on both sides of the entrance. There is considerable trade by junks with ports on the east coast of China.

The town of Kōryū (*Lat. 24° 37′ N., Long. 120° 47′ E.*) is situated on the north bank and about 2 miles up the river. The village of Kōshi ryō is situated at the foot of Piatau san; three white oil tanks on the western side of this village, and the iron bridge over the river, are conspicuous. Local storm signals are displayed at Kōshi ryō.

Coast.—Dangers.—The coast between Kōryū and Kyūkō (Kukan), about 16 miles north-north-eastward, is a sandy beach with occasional rocky parts, and within are alternating flat plains and hills; the coastal bank dries out to fully one mile in places. From Kyūkō to Hakusha kō, about 14 miles north-eastward, there is a sandy beach covered with scrub and grass, with a broad, cultivated plain within.

Charts 1761, 1968, 2412, 1262.

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Chart 3658.

The Chūkō kei flows into the sea about 4 miles north-eastward of Kōryū. There is a bar, which dries, across the mouth of the river, but a narrow passage, which changes from time to time, permits small craft to enter at half tide. Chūkō hakuchi (Chunkan road), off the mouth of the river, affords temporary anchorage in a depth of about 5 fathoms (9m1), about half a mile outside the bar; this anchorage is sheltered from southerly winds, but the holding ground is bad. Ipo san, 205 feet (62m5) high, is situated on the southern side of the mouth of the Chūkō kei, and about 1¼ miles westward of Ipo san is a hill with red cliffs and a sharp summit, 172 feet (52m4) high; these two hills are conspicuous landmarks for identifying the river entrance. A sandy shoal, with a depth of 1¼ fathoms (2m7) over it, lies nearly 3 miles northward of Ipo san and 1¼ miles offshore.

Ensui kō (Yamutsuikan) is the mouth of a small river about 5 miles north-eastward of the mouth of the Chūkō kei. A sandbank, 3 feet (0m9) high, lies on the coastal bank which dries out to fully one mile offshore here; on the southern side of this sandbank there is a channel over the coastal bank which can be used by small craft at half tide. The village of Kōzan is situated about one mile northward of Ensui kō. A reef, with a depth of 2 fathoms (3m7) over it, lies about 2 miles north-north-westward of Ensui kō and 1¼ miles offshore.

About 6¼ miles northward of Ensui kō the Kyūkō kei and Hōzan kei flow into the sea through a single channel across the coastal bank, which is, however, only available for small craft at half tide; the village of Kyūkō (Kukan), with a population of 900 in 1931, is situated at the mouth of the Kyūkō kei, and the Custom office, a red brick building in it, is fairly conspicuous. Shinchiku shi (Shinteku), situated about 2½ miles south-eastward of Kyūkō, had a population of 47,534 in 1931.

Kōshikō san (Table hill) is a grassy hill with a flat summit situated about 2 miles north-eastward of Kyūkō, and is conspicuous on the otherwise low coast.

Kōmō kō (Ammōkantsun) and Kantōseki kō (Kantōtsukan), about 1¼ and 7 miles north-north-eastward of Kōshikō san, respectively, are small harbours in the mouths of rivers, but they are only available for junks.

Hakusha kō.—Light.—Hakusha kō (Pakusa point), the north-west point of Formosa, has a grassy sandhill 62 feet (18m9) high on it, but the coast is almost straight and the point does not project. A sandbank dries out to fully half a mile offshore on the south-western side of the point.

A light is exhibited, at an elevation of 120 feet (36m6), from a white circular brick tower, 74 feet (22m6) in height, situated on Hakusha kō (*Lat. 25° 03′ N., Lat. 121° 04′ E.*).

Current and tidal streams.—About 5 miles offshore in the vicinity of Tsūshō, Kōryū, and Chūkō the "Kata shio" (one-direction current) always sets northward with considerable strength, but is weakened during rising water and reinforced during falling water. Approaching nearer the coast the rate of this current is gradually reduced, and within a distance of 2 miles offshore it almost disappears with the south-going tidal stream. The rate of the current does not appear to exceed 2 knots northward of Hakusa kō.

Charts 1760, 1761, 1968, 2412, 1262.

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Chart 3658.

NORTHERN SIDE OF FORMOSA.—Coast.—Dangers.—The coast for about 12½ miles east-north-eastward of Hakusha kō (*Lat. 25° 03′ N., Long. 121° 04′ E.*) consists mostly of low sand hills, fronted by shoal water for about half a mile, and thence to Tansui kō, about 8 miles farther east-north-eastward, is formed by a tableland from 486 to 710 feet (148m1 to 216m4) high.

Kyoseki kō (Kōtsūkan) and Nankan kō (Nankankan) about 6 miles and 10½ miles, respectively, east-north-eastward of Hakusha kō, are small junk harbours at the mouths of rivers, but are only available at high water. Two pinnacle rocks, with depths of 1½ and 2¾ fathoms (2m7 and 5m0) over them, lie about 7 cables and 1¼ miles, respectively, north-eastward of Nankan kō.

Chart 2376, plan of Tansui kō.

Tansui kō.—Tansui kō is the estuary of the Tansui ka, which flows into the sea about 9 miles east-north-eastward of Nankan kō. It is the only river port in Formosa, and is only available for small vessels; even these are obliged to wait for high water before crossing the bar off the entrance. The harbour limit is within the arc drawn with a radius of 2 miles from Tansui kō lower leading light, the Outer harbour is the area westward of a line drawn from this light to the southern entrance point of the river, and the Inner harbour is the area eastward of this line.

The bar is about one mile wide, and the fairway channel across it is from one to 2 cables wide, with a least depth of 8 feet (2m4) in 1932. Within the bar the channel runs along the northern bank, and is from one to 2½ cables wide, with general depths of from 9 to 12 feet (2m7 to 3m7), as far as Piatau (Bishi tō), situated on the northern bank about 1¾ miles within the entrance. The southern side of this part of the river is occupied by mud flats, which partly dry.

The depths in the entrance change every time the river is in flood; the bar is inclined to be shoaler in winter, the depths being from one to 3 feet (0m3 to 0m9) less than those in summer. Typhoons also appear to effect the depths on the bar considerably.

Tansui gai is situated on the northern side of the harbour a short distance within the entrance, and had a population of 24,829 in 1935. Taihoku, the capital of Formosa and the seat of the Governor-General, is situated about 9 miles up the river. Tansui is connected to the railway system on the western and northern sides of Formosa.

Lights.—Buoys.—Leading lights are exhibited at Tansui. The front light is exhibited, at an elevation of 33 feet (10m1), from a white square iron tower, situated on the northern side of the entrance to Tansui kō; the rear light is exhibited, at an elevation of 141 feet (43m0), from a white mast, 35 feet (11m0) in height, on a hill about 7 cables eastward of the front light. These two lights in line, bearing about 092°, lead through the channel over the bar under normal conditions.

A black conical buoy, surmounted by a cylinder, is moored off the outer edge of the bar and nearly 1¾ miles westward of the front leading light; this buoy marks the northern side of the approach to the channel over the bar. A red conical buoy, surmounted by a triangle, is moored off the northern edge of the sand spit extending from the southern entrance point to the river. These buoys cannot always be relied on.

Charts 1761, 1968, 2412, 1262.

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Charts 2376, plan of Tansui kō.

Anchorage.—Piers.—The best outer anchorage is about 1½ miles west-north-westward of the lower leading light (*Lat. 25° 11′ N., Long. 121° 25′ E.*), in a depth of about 7 fathoms (12m8), mud; this position is, however, entirely exposed, and vessels must be prepared to get under way immediately.

The anchorage space in the inner harbour is very restricted, with only three places where vessels with a draught of 12 feet (3m7) can moor; one of these berths is occupied by a mooring buoy for the use of local steam vessels. There are several berths for vessels with draughts of from 10 to 11 feet (3m0 to 3m4). Owing to the sandy bottom in the river, vessels are liable to drag their anchors; as the space is restricted they should moor, with the anchors up and down stream.

During floods the rate of the stream in the river is considerably increased, and there is then a strong eddy along the northern bank between Piatau and a position one mile farther up the river. With heavy squalls the stream is converted into whirlpools, and at the junction of this river with the Kīrun river, about a mile below Taihoku, a powerful torrent is formed, which rushes towards the harbour mouth, churning up mud and sand from the bottom of the river, rendering the situation of vessels at anchor extremely dangerous. With the river in flood the safest anchorage is off the north bank between the Custom's flagstaff, situated about 3 cables westward of the rear leading light, and the Garrison wharf, about a quarter of a mile farther westward; under any circumstances vessels should never anchor southward of the centre of the stream nor outside Garrison wharf.

There are three stone piers near the railway station, which is situated at the eastern end of Tansui, and close south-eastward of them is a wooden pier belonging to an oil company; there is a mooring buoy off the wooden pier suitable for vessels of about 3,000 tons.

Pilots.—In 1932 there was one unlicensed pilot who was reported to be reliable. Vessels requiring a pilot should apply to the District office or to the Custom house.

Directions.—Kanin (Kannon) san, a mountain 1,986 feet (605m3) high, situated on the southern side of the entrance to Tansui kō, is a good mark for making the harbour; from the southward it shows two peaks, but from other directions it appears as one sharp peak and is very conspicuous. On the northern side of the estuary, and about one mile north-westward of the lower leading light, is a disused lighthouse; a W/T station, with four wireless masts, situated south-eastward of the disused lighthouse, is also conspicuous.

Vessels making for the inner harbour should cross the bar with the light-structures, or their lights at night, in line, bearing about 092°, passing southward of the black buoy just outside the bar; as the channel is liable to shift, caution must be exercised. Vessels must then pass northward of the red buoy marking the sandy spit on the southern side of the entrance, and thence follow the north bank at a distance of about half a cable.

Storm signals.—Local storm signals are displayed from the Government offices, situated about half a mile south-eastward of the Custom house; *see* page 38.

Harbour facilities.—Provisions of all kinds are obtainable; there are no regular water boats, but water can be taken in from junks or sampans.

Charts 3658, 1761, 1968, 1969, 2412, 1262.

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Chart 2376, plan of Tansui kō.

There is a plentiful supply of native coal, and fuel oil can be obtained.

The port is connected to the general telegraph system.

Trade.—Shipping.—The principal exports are cotton goods, coal, dried fish, and hemp; imports are timber, oil, ironware and wheat.

In 1931, 65 steam vessels with an aggregate of 48,380 tons, and 149 sailing vessels with an aggregate of 8,429 tons, entered the port.

Regulations.—*See* Regulations for Open Ports in Formosa, page 46. Quarantine is enforced at Tansui kō in accordance with the Naval Ports Quarantine Law; *see* page 49. The following local regulations are in force at Tansui kō :—

The Inner harbour is an area in which vessels are at liberty to anchor permanently; the Outer harbour is for temporary anchorage

Signals to vessels will be made by the International Code of Signals, and will be hoisted as the signals staff on the lower leading light-structure.

Vessels must not impede the freedom of other vessels to navigate or anchor.

Vessels to which Article VI, paragraph 1, of the Regulations for Open Ports in Formosa applies, must await the Harbour master's instructions in the Inner harbour, westward of a line drawn 225° from the western end of the wharf by the Custom house.

Climate and health conditions.—The climate of Tansui is hot in summer, but cool and damp in winter, the extremes ranging from 98 Fahr. in July to 41° in December.

Malaria is rife during the summer season, and beri-beri is also prevalent; the contagious diseases are typhoid and scarlet fever. There are not many species of injurious insects, but in the neighbouring mountains there is an extremely poisonous small snake.

Chart 3658.

Coast.—Light.—The coast between the northern entrance point to Tansui kō and Fūki (Puki) kaku (*Lat. 25° 18′ N., Long. 121° 32′ E.*), about 10 miles north-eastward, is a beach of sand and pebbles, fringed by a reef extending as much as half a mile in places. Within the beach are low hills, rising gradually inland to Daito san, a range with peaks over 3,000 feet (914^{m}4) high, situated about 5 miles from the coast.

Fūki kaku, the north point of Formosa, is low and a rocky shoal extends about a quarter of a mile from it; there is usually a strong tide race in this vicinity, and the point should be given a wide berth. There is a small beach between the rocks on the western side of the point, where landing can be effected in calm weather.

A light is exhibited, at an elevation of 161 feet (49^{m}1), from an octagonal iron tower, 100 feet (30^{m}5) in height, painted black and white in horizontal bands, situated on Fūki kaku. A fog signal is sounded from the lighthouse.

Tidal streams.—Between Tansui kō and Fūki kaku the tidal streams run north-eastward for 7 hours, and south-westward for 5 hours; near Fūki kaku, during the south-west monsoon, the east-going stream may attain a rate of 5 knots, and the west-going stream about 2 knots. Northerly or north-easterly winds cause strong tide races and heavy seas off this point, and the navigation of small vessels in this vicinity is then extremely hazardous.

Charts 1761, 1968, 2412, 1262.

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Chart 3658.

Coast.—The coast between Fūki kaku and Shishitō bi, a cliffy point about 7½ miles south-eastward, is rocky; about 4 cables southward of Shishitō bi is a round-topped hill 247 feet (75m3) high, A curiously shaped rock, named Shokudai sho, 77 feet (23m5) high, lies about 2 cables eastward of this point, and reefs extend about 6 cables eastward from the rock; the outer reef is awash. On the southern side of Shishito bi is a small harbour, suitable as a refuge for small vessels with local knowledge. Kinpo ri (Kimpori) about three-quarters of a mile south-westward of Shishitō bi, is a prosperous place, and small quantities of provisions can be obtained there.

Yaryū hantō is a peninsula extending from the coast in a north-easterly direction; Kūtau pii, its outer extremity, lies about 3 miles east-south-eastward of Shishitō bi, and is a steep sandstone point with rocks extending 2 cables from it, the outermost being 21 feet (6m4) high. Yaryū wan (Masu bay), between Shishitō bi and Yaryū hantō, has a long sandy beach and affords anchorage for small vessels.

The greater part of the coast between Yaryū hantō and Banjintai bi, about 9 miles south-eastward, is fringed by reefs and rocks, which extend as much as 2 cables offshore in places.

Chart 2618.

Off-lying island and dangers.—Shin rai, about 2½ miles northward of Banjintai bi, consists of two rocky heads about 1½ cables apart; the western has a least depth of 3 fathoms (5m5) over it, and the eastern 3½ fathoms (5m9). There are depths of from 7 to 16 fathoms (12m8 to 29m3) between these two heads. The 394-foot (120m1) high hill on Bitō kaku (page 188), the north-east point of Formosa, in line with the south-west point of Kīrun tō, bearing 117°, leads about 3 cables north-eastward of Shin rai; these rocks are covered by the *red* sector of Banjintai bi light (*Lat. 25° 09′ N., Long. 121° 44′ E.*) between the bearings of 181° and 187°.

Kīrun tō, about 2¾ miles north-eastward of Banjintai bi, is a precipitous, black, rocky island with a flat summit, and is an excellent mark for making Kīrun kō. Shōkitsu, about one cable off the north-western side of the island, is a rocky islet 92 feet (28m0) high. Kitsugan sekitai, a spit of gravel and rock, extends about 1½ miles south-westward from Kīrun tō; up to a distance of 6 cables from the island there are depths of less than 3 fathoms (5m5) over this spit, and beyond this the depths increase gradually to 14 fathoms (25m6) at its outer end. There are strong tide races over the entire spit, and it should never be crossed. Banjintai bi lighthouse bearing 238°, and open north-westward of Chū san, situated on the eastern side of the entrance to Kīrun kō, leads south-eastward of Kitsugan sekitai. There is a clear channel between this spit and Chū san.

KĪRUN KŌ.—Kīrun (Kiirun) kō or Keelung, the principal harbour in Formosa, is entered between Banjintai bi and Tōban sho, about half a mile north-eastward. The harbour is sheltered by hills on the eastern, western, and southern sides, and from the north-eastward by the islands Chu san and Sharyō tō; the latter is separated from the main coast southward by the narrow channel Hasshaku mon, which is crossed by a white stone bridge.

From the entrance the harbour runs for nearly a mile in a southerly direction as far as Sendō bi breakwater, which is situated on the western side; this part is known as the Outer harbour. The Inner

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Chart 2618.

harbour runs in a south-westerly direction for nearly 1¼ miles, and has a width of about 2 cables. Northerly winds cause a heavy sea in the Outer harbour, but it affords safe anchorage with winds from any other direction. The Inner harbour affords safe anchorage at all times; in 1934 the outer part had been dredged to a depth of 36 feet (11m0), the middle part to a depth of 32 feet (9m8), and the remainder, except at the head, to a depth of 30 feet (9m1). In 1936 dredging was in progress southward of Tōban sho. The land in the vicinity of the harbour is thickly wooded and rises in undulating hills backed by high mountains.

Tidal streams.—The tidal streams near the north coast of Sharyō tō run westward from one to 7 hours after low water, and eastward from 7 hours after low water to one hour after the next low water; the maximum rate is from 2 to 3 knots. In winter the east-going stream is stronger than the west-going stream, and in summer the reverse is the case.

The tidal streams off the north-western side of Sharyō tō, just outside the harbour entrance, are very irregular, and their rate does not appear to exceed one knot. The tidal streams inside Kīrun kō are very weak.

Outer harbour.—Dangers.—Banjintai bi, the western entrance point of the harbour, is remarkable owing to the peculiar shape of some sandstone rocks lying close off it; on the seaward side of the point are several patches of perpendicular, stratified cliffs. A rock, with a depth of 6¾ fathoms (12m3) over it and from 7 to 9 fathoms (12m8 to 16m5) around, lies nearly 2 cables northward of the point. In 1936, a breakwater was under construction at Banjintai bi.

Tōban sho, on the eastern side of the entrance, consists of several rocky islets surrounded by coral reefs; foul ground extends about 1¼ cables from the northern side of Tōban sho. Sharyō tō and Chū san are connected together by reefs; foul ground extends nearly 4 cables from the western sides of these two islands, embracing Tōban sho. The north-east coast of Sharyō tō and the northern side of Chū san are fringed by a rocky shelf which extends as much as 1¼ cables; U shō, a rock 5 feet (1m5) high, lies about 2 cables eastward of Senzan bi, the east point of Sharyō tō, and a sunken rock lies about half a cable north-eastward of U shō. Hasshaku mon, the narrow channel between Sharyō tō and the mainland, is only available for boats and junks, and a rock, which dries one foot (0m3), lies in its narrowest part. A breakwater extends in a southerly direction from the south-western extremity of Sharyō tō, and encloses a fishing harbour which had been dredged, in 1935, to depths of from 10 to 19 feet (3m0 to 5m8); there are some mooring buoys in this harbour.

Kagō ō is a small bay on the western side of the Outer harbour and immediately southward of Banjintai bi (*Lat. 25° 09′ N., Long. 121° 44′ E.*). There are two piers at the head of this bay, and between these two piers is Sendō Quarantine station. Foul ground extends about 1¼ cables eastward from the southern entrance point of Kagō ō. Sendō bi, about 6 cables southward of Banjintai bi, is the extremity of a small promontory, on which is Sendō san, a conspicuous, conical hill 188 feet (57m3) high. A coral reef, with a least depth of 4 feet (1m2) on its outer end, extends about 1½ cables eastward from Sendō bi; a breakwater extends eastward from this point and over the coral reef.

Charts 3658, 1761, 1968, 2412, 1262.

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Chart 2618.

The limits of the Outer harbour are a line drawn from Banjintai bi to the north-west point of Chū san, and a line drawn eastward from the extremity of Sendō bi breakwater.

Lights.—A light is exhibited, at an elevation of 132 feet (40m2) from a white circular tower, 28 feet (8m5) in height, on Banjintai bi. A fog signal is made from the lighthouse.

A light is exhibited, at an elevation of 41 feet (12m5), from an octagonal concrete structure, 36 feet (11m0) in height, painted black and white in horizontal bands, situated on the north-western extremity of Tōban sho.

A light is exhibited, at an elevation of 25 feet (7m6) from a black iron column, 25 feet (7m6) in height, on the south-western extremity of Tōban sho.

A light is exhibited, at an elevation of 23 feet (7m0), from a red circular concrete tower, 20 feet (6m1) in height, situated on the extremity of the breakwater of Hasshaku mon fishing harbour.

A light is exhibited, at an elevation of 59 feet (18m0), from a red square column on an octagonal concrete base, 54 feet (16m5) in height, on the extremity of Sendō bi breakwater.

A light is exhibited, at an elevation of 437 feet (133m2), from a mast, 30 feet (9m1) in height, painted black and white in horizontal bands, on the summit of Kyūshi san, situated about 3½ cables westward of Sendō bi.

Buoyage.—A cylindrical light-buoy, painted red, exhibiting a *red flashing* light *every two seconds*, is moored about 2 cables north-eastward of Banjintai bi lighthouse, and marks the works for the breakwater under construction in that locality.

A light-buoy, painted black, exhibiting a *green flashing* light *every two seconds*, is moored off the south-western extremity of the reefs which extend about 2 cables southward from Tōban sho light-structure.

A light-buoy, painted red, exhibiting a *red flashing* light *every three seconds*, marks the extremity of the reefs extending from the southern entrance point of Kagō ō.

A black conical buoy is moored about 1½ cables eastward of the extremity of Sendō bi breakwater and close to the eastern limit of the deepest part of the dredged channel.

Anchorage.—Prohibited anchorage.—The best anchorage in the Outer harbour is with Tōban sho light-structure bearing 008°, distant about half a mile, in depths of from 7 to 9 fathoms (12m8 to 16m5), good holding ground.

In accordance with the Regulations for Open ports in Formosa (page 46) vessels are prohibited from anchoring in the fairway, which is bounded by the following lines :—

(a) A line drawn 350° from the light-structure on Sendō bi breakwater to the northern limits of the harbour.

(b) A line drawn 095° from the same light structure for a distance of 1 9/10 cables.

(c) A line drawn 332° from the end of (*b*) for 3¾ cables.

(*d*) A line drawn 350° from the end of (*c*) to the northern limit of the harbour.

Inner harbour.—Quays are constructed along the whole of the north-western side of the Inner harbour, and also on both sides of Gyuchō kō (*Lat. 25° 08′ N., Long. 121° 44′ E.*), a basin which has

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Chart 2618.

been dredged to a depth of 30 feet (9m1) and runs in a north-westerly direction from the middle of this side of the harbour. The berths at these quays are numbered 1 to 18; Nos. 1 to 4, situated at the inner end, are principally used by passenger steamers running to schedule; Nos. 5 to 13 are in Gyuchō kō, and Nos. 6 to 10 can accommodate 5 vessels of 3,000 tons, Nos. 7 to 10 being appropriated for unloading coal; Nos. 13 to 18 can accommodate 6 vessels up to 20,000 tons. All these quays are connected with the railway system. At No. 4 berth there is one crane with a lifting capacity of 30 tons and one with a capacity of 10 tons; at berths 14 to 18 there are two cranes, each lifting 3 tons. A berthing anchor, with the cable connected to the sea wall, is laid down close off No. 15 berth. There is a dry dock at the head of Gyuchō kō, *see* Appendix I.

In 1934 the depth alongside No. 1 berth was 27 feet (8m2), Nos. 2 to 10 berths 30 feet (9m1), Nos. 11 and 12 berths 18 feet (5m5), Nos. 14 to 16 berths 32 feet (9m8), and Nos. 17 and 18 berths 36 feet (11m0).

There are unloading wharves, principally used by junks, along the south-eastern side and the head of the Inner harbour and there is a pontoon at the head. On the south-eastern side of the harbour are two concrete floating piers; the inner one is named Tsushimo pier, and the outer one Taishō pier, and each is capable of taking a vessel of 2,000 tons. There are nine mooring buoys in the inner harbour.

Signals.—The following berthing signals, for the piers and mooring buoys, are made by flags of the International Code of Signals above the answering flag and are displayed at Banjintai bi lighthouse and at the flagstaff above the harbour office:—

Signal.	*Signification.*
A	Berth with stern to No. 1 buoy, bows down harbour.
B	Berth at Tsushima pier, stern to No. 2 buoy.
C	Berth at Nos. 3 and 4 buoys, stern to No. 3 buoy.
D	Berth at Daisei pier, stern to No. 4 buoy.
E	Berth at No. 5 buoy, head up harbour.
F	Berth at Nos. 5 and 6 buoys, stern to No. 5 buoy.
G	Berth with stern to No. 6 buoy, bows down harbour.
H	Berth at No. 7 buoy, bows up harbour.
I	Berth at Nos. 7 and 8 buoys, stern to No. 7 buoy.
J	Berth at No. 8 buoy, bows down harbour.
K	Berth at No. 9 buoy, bows up harbour.
L	Berth at No. 9 buoy, bows down harbour.

The following berthing signals, for securing at the quays, are made by flags of the International Code of Signals, below a black ball:—

Signal.	*Signification.*
A	Secure to No. 1 berth.
B	Secure to No. 2 berth.
C	Secure to No. 3 berth.
D	Secure to No. 4 berth.
E	Secure to No. 5 berth.
F	Secure to Army quay No. 6.
G to R	Secure to Nos. 7 to 18 berths.

Charts 3658, 1761, 1968, 2412, 1262.

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Chart 2613.

Anchoring and other signals are made by flags of the International Code of Signals, below a black ball, as follows:—

Signal.	*Signification.*
AB	Anchor in the Outer harbour clear of the fairway.
AC	Anchor temporarily in the Outer harbour, clear of the fairway, and await orders.
AD	You will be examined at your appointed anchorage or in the Inner harbour; proceed; signal if anything is wrong.
AE	Delay leaving harbour.
AF	Delay proceeding into the Inner harbour.
AG	Cancel the previous signal.

Note.—If there are two or more vessels which might consider that the signals are for them, the vessel to which the signal applies will be indicated by a display of her distinguishing or House flags.

Regulations.—The following are extracts from the regulations for Kīrun kō:—

Kīrun kō is bounded as follows: Inner harbour — the water area southward of a line drawn 090° from the extremity of Sendō bi breakwater; Outer harbour—the water area outside the Inner harbour.

Vessels bound for the Inner harbour will receive, whilst they are in the Outer harbour, instructions by signals from the Harbour master as to their anchoring berth (*see* Berthing signals on page 185).

When vessels which require instructions as to their berth enter the harbour after sunset, they must remain in the Outer harbour till sunrise. This does not apply to mail steamers or to other vessels which have received the permission of the Harbour master.

Ocean-going vessels must drop two anchors when they arrive at their anchoring berths, unless they are securing between buoys or proceeding alongside the quays.

Vessels meeting in the public fairway must each keep to their starboard hand. Vessels must not unnecessarily overtake and pass other vessels in the fairway.

Vessels must pass close to breakwaters, wharves, and moored vessels when these are on their starboard hand, and must give them a wide berth when they are on their port hand.

The Regulations for avoiding Collisions at Sea are to be observed in the navigation of vessels, unless the contrary is specified in these regulations.

When the vessels referred to in paragraph 1 of Article VI of the Regulations for Open Ports in Formosa (page 46) enter the port, they must wait in the Outer harbour for instructions from the Harbour master.

The firing of salutes must be carried out in some place outside Gyuchō kō.

A vessel making for Gyuchō kō must sound long blasts continuously after passing Sendō bi breakwater; a vessel leaving Gyuchō kō must do the same after not more than one minute from weighing anchor.

Vessels inside the harbour must not needlessly sound whistles or sirens except as laid down in the regulations.

For Regulations for Open Ports in Formosa, *see* page 46; for Quarantine Regulations for Formosa, *see* page 50.

Dredgers.—When dredgers are at work in the harbour, vessels which intend to pass them must notify them in advance. In order

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Chart 2618.

to make the passage as easy as possible the dredgers will indicate the course by means of the flags of the International Code of Signals.

Harbour facilities.—Large quantities of native coal are stocked, and it can be loaded at the coaling quays or from lighters. Fuel oil is available, and can be taken on board alongside or from tank vessels.

Provisions of all kinds are plentiful. Water can be taken in alongside the quays or from water-boats.

Powerful tugs are available.

There is one Government hospital, one public hospital, and many private ones.

Kīrun is connected to the railway system on the western side of Formosa, and also with Suō on the east coast. There is regular steamship communication with Japan, the principal ports of China, the Philippines, and Java.

Storm signals.—General storm signals are exhibited at the Harbour office, situated on the eastern side of the Inner harbour; if this station is out of action the signals are exhibited from a mast about a quarter of a mile eastward of the Harbour office. *See* page 34.

Local storm signals are displayed at a flagstaff about half a mile north-eastward of the Harbour office; *see* page 38.

Pilotage.—The pilotage area of Kīrun kō lies within the lines drawn from the extremity of Yaryū hantō to the north-east point of Kīrun tō (*Lat. 25° 12′ N., Long. 121° 47′ E.*), and from the latter point to the north-west point of Chū san. The Pilot's office is about a cable northward of the Harbour office.

Pilotage is not compulsory. A licensed pilot can be obtained by hoisting the customary signals of the International Code of Signals, or by applying in advance at the Harbour office, stating the expected time of the vessel's arrival. The pilot will board the vessel at the limit of the pilotage area or near the limit of the harbour, but in bad weather it is usual to embark the pilot inside Banjintai bi. The pilot boat is a white steamboat resembling a yacht, with "Licensed Pilot" in black, displaying the pilot flag (a square flag, the upper half white, lower half red).

Kīrun.—The town of Kīrun is situated at the head of the Inner harbour. In 1935 the population was 86,697.

Trade.—Shipping.—The principal exports are wheat, rice, sugar, and camphōr; imports are silk and cotton goods, iron, timber, and paper.

In 1931, 2,197 vessels with a total tonnage of 4,402,688 tons, and 393 sailing vessels of 26,548 tons entered the port.

COAST.—Lights.—Hatto kō is a small bay entered between Mubikō bi, situated nearly three-quarters of a mile south-eastward of Senzan bi (page 183), and Rokohei kaku, about half a mile east-south-eastward; it is open northward and is encumbered with rocky shoals.

Chart 3658.

The eastern side of Hatto kō is an island almost connected to the mainland; reefs and rocks extend about one cable from the north-east point of the island.

Shinō (Chimuo) wan is a small bay situated about 2 miles south-eastward of Rokohei kaku; reefs extend about one cable from both

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Chart 3658.

entrance points. Vessels with local knowledge can obtain anchorage in the centre of the bay, sheltered from all winds except from the north-eastward, in depths of from 6 to 7 fathoms (11^{m}0 to 12^{m}8). Over 100,000 tons of ore are exported annually from this bay, and some mooring buoys, maintained by the mining company, are laid down for vessels taking in cargo; there is also a wooden pier and a mole.

A conspicuous, round-topped mountain, 1,939 feet (591^{m}0) high, rises steeply from the coast about one mile east-south-eastward of the south-eastern entrance point of Shinō wan.

Bitō (Peitau) kaku is a steep, cliffy headland, 394 feet (120^{m}1) high, situated about 5½ miles eastward of the eastern entrance point of Shinō wan, and appears as an island from a distance. A small boat harbour and Bitō fishing village are situated on its north-western side. The lights of a mine near the summit of a mountain, 2,455 feet (748^{m}3) high, situated about 4 miles south-westward of Bitō kaku can be seen from a distance of 30 miles in clear weather. About one mile southward of Bitō kaku is Rōdō wan, a small bay with a depth of 8 fathoms (14^{m}6) in the centre, which affords temporary anchorage, except with easterly winds, to small vessels with local knowledge; caution must be exercised when entering or leaving, as a rock, which dries 4 feet (1^{m}2), lies nearly in the middle of the entrance.

A light is exhibited, at an elevation of 220 feet (67^{m}1), from a white hexagonal tower, 41 feet (12^{m}5) in height, situated on Bitō kaku (*Lat. 25° 08′ N., Long. 121° 55′ E.*).

The coast between Bitō kaku and Sanchō kaku (page 197), about 8 miles south-eastward, is bordered by rocks and shoals to a distance of half a mile in places.

Off-lying islets.—Light.—Kahei sho (Pinnacle island), nearly 18 miles northward of Bitō kaku, is a rugged rock with black perpendicular sides, surrounded by numerous pointed rocks; a reef on which the sea generally breaks, extends fully one cable from its western side.

Chart 1968.

Menka sho (Craig islet), about 9½ miles north-eastward of Kahei sho, is a rocky islet with three rounded peaks, the easternmost being the highest. The south and east coasts consist of precipitous cliffs; the north coast is low and rocky, and is indented by a small cove. Close off the eastern side of the islet is a conspicuous pointed rock, 139 feet (42^{m}4) high, named Byōbu iwa; there is a small black pointed rock on the western side of the islet. The eastern side of the islet is steep-to, but elsewhere there are depths of less than 10 fathoms (18^{m}3) up to a distance of from 2 to 4 cables offshore. In 1926 the *Tensei maru*, with a draught of 23 feet (7^{m}0), touched an obstruction of unknown character 8½ cables southward of the summit of Menka sho.

Hōka sho (Agincourt island), about 8 miles northward of Menka sho, has two rounded peaks, the eastern being slightly the higher; there are scarcely any trees on the island, but it is covered with grass and rushes, and there is a breeding ground for mountain sheep. There are a few houses, inhabited by fishermen, on the west coast. The eastern side is steep-to, but on the western and southern sides there are depths of less than 10 fathoms (18^{m}3) up to a distance of about 3 cables offshore; a rocky shoal, with a depth of 9 fathoms (16^{m}5) over it, lies about 1¾ miles southward of the island.

Charts 1262, 1243.

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Chart 1968.

A light is exhibited, at an elevation of 477 feet (145m4), from a white circular tower, 70 feet (21m3) in height, situated on the summit of Hōka sho. A fog signal is sounded from the lighthouse (*Lat. 25° 38′ N., Long. 122° 05′ E.*).

Chart 2412.

Submarine volcano.—On 18th April, 1916, steam was observed rising from the sea about 40 miles north-north-eastward of Hōka sho. In June, 1927, some patches of discoloured water, with tide-rips, were seen in the same position; in 1931, however, vessels passing this vicinity did not observe anything unusual. According to the report of a fisherman a discoloured patch, about one mile in diameter is frequently observed in spring and summer about 1½ miles north-westward of the position when the steam was seen. Vessels navigating in this area should exercise caution.

Chart 1968.

EASTERN SIDE OF FORMOSA.—The east coast of Formosa is steep-to, and mountains rise almost directly from the sea to an elevation of over 3,000 feet (914m4) in places; there are, however, broad plains at Pinan (page 189) and Karenkō (page 193), which terminate in sandy beaches at the coast. Within the coastal range of mountains between these two plains is a long, narrow plain watered by three rivers: the Pinan taikei, which flows southward and discharges into Taitō hakuchi; the Shūkoran kei, which traverses the middle part of the range; and the Karen kei, which flows northward and discharges at Karenkō.

The coast is little indented, and Suō wan is the only bay which affords complete shelter. During the north-east monsoon, especially between November and the end of February, there is usually a heavy sea along the coast, and it is impossible to discharge cargo, though mails and passengers can be landed at Karen kō. There is railway communication between Pinan and Karen, and between Suō and Kīrun.

The coastal inhabitants between Pinan and Karen kō are of a peaceful disposition, and live chiefly by agriculture. In the mountainous regions, however, especially near Karen kō and further northward, there are fierce savages who still carry out the practice of head hunting, and it is impossible at present for the Japanese to enter these districts.

Chart 3804.

Coast.—Dangers.—Kōkō wan is entered between Garan bi (page 161) and Kōkō bi (Kankau pii), about 6 miles northward, and affords anchorage with south-westerly winds only. A 2½-fathom (4m1) patch lies about 8 cables offshore and nearly 1½ miles northward of the eastern extremity of Garan bi (*Lat. 21° 54′ N., Long. 120° 51′ E.*). A rock, 4 feet (1m2) high, lies about 2 miles northward of the eastern extremity of Garan bi, and about 1½ cables eastward of this rock is another rock 25 feet (7m6) high. The bottom throughout the bay is mostly sand, but there are a few rocky patches, with a least depth of 6 fathoms (11m0), in the northern part. The Kōkō kei flows into the north-west corner of the bay, and the village of Kōkō is situated on the northern bank about three-quarters of a mile within the entrance.

Shuppū bi (Tsūpon pii), about 8½ miles northward of Garan bi, consists of high cliffs and is visible from a great distance; some rocks lie close off this point. Nanjin bi is situated about 4 miles northward

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Chart 3804.

of Shuppū bi, and an islet lies close off it; nearly one cable northward of this islet is a rock awash. A rock, 5 feet (1m5) high, lies about 3 cables south-eastward of Nanjin bi.

Hachiyō wan is a slight indentation in the coast between Nanjin bi and Kōshi bi, about 2¼ miles northward; it affords anchorage for small vessels with offshore winds. The shore of the bay is a sandy beach backed by conspicuous sandhills. Kōshi bi is fringed by rocks to a distance of about a quarter of a mile.

Chart 1968.

The Taibu kei flows out about 13 miles northward of Kōshi bi; Taibu, the seat of Government for the district, is situated about half a mile southward of its entrance.

Chart 3804.

Off-lying islands.—Kōtō sho lies with its north-west point about 38 miles east-north-eastward of Garan bi and rises steeply from the sea; it appears saddle-shaped on northerly and southerly bearings. The island has many steep peaks, densely wooded, the highest, named Kōtō san, being 1,807 feet (550m0) high; there are several streams, all having plenty of water. There is nearly always a low-lying mist over the island, caused by the high temperature which accompanies the Kuro shio or Japan stream; in winter the island is sometimes obscured by continuous rain, and great caution is, therefore, necessary when approaching, especially at night.

The coast of the island is rocky almost throughout, and numerous pinnacle rocks below water render it unsafe for vessels without local knowledge to approach the coast within one mile. A point on the west coast, situated about 2 miles southward of the north-west point of the island, consists of a peaked rock 308 feet (93m9) high, connected to the main island by low land and appearing as an islet from a distance. Rakuda iwa, an islet composed of several peaked rocks, 144 feet (44m0) high, lies about half a mile off the north-east point of Kōtō sho, and between this islet and the coast are several remarkable pillar rocks.

There are seven villages on the island, and the inhabitants are of a mild and pleasant disposition; the women carry out agricultural work, and the men are occupied in fishing. Their huts are merely excavations in the ground, covered with thatch and surrounded by stone walls, so only the roofs are visible from outside; there are, however, various sheds two stories high. Skin diseases and malaria are prevalent. The products are mother-of-pearl, pottery, and bananas.

Yashiro wan is a bay on the south-west coast of Kōtō sho, and affords anchorage for vessels with local knowledge in its north-western part with northerly winds; the bottom is fine sand, good holding ground. Oki no iwa, a pillar rock 27 feet (8m2) high, lies nearly 4 cables south-westward of the north-western entrance point of the bay, with some sunken rocks between, and is a useful mark when entering. The best anchorage is about 3 cables offshore, in a depth of about 10 fathoms (18m3), with Oki no iwa bearing 270°, and the police station, a conspicuous white building about three-quarters of a mile eastward of the north-western entrance point of the bay, bearing 027°.

Tosei wan, on the eastern side of Kōtō sho, affords safe anchorage to vessels with local knowledge except with easterly winds. The best anchorage is between two villages in the north-western part of the bay,

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Chart 3804.

about 3 cables offshore, where the depth is less than 11 fathoms (20m1), sand. A pinnacle rock, with a depth of 2½ fathoms (4m3) over it, lies about 6 cables southward of the northern entrance point of the bay; about three-quarters of a mile south-eastward of this rock is a rocky patch with a least depth of 3½ fathoms (6m4).

Shōkōtō sho (*Lat. 21° 57′ N., Long. 121° 37′ E.*) lies about 3 miles south-south-eastward of the south point of Kōtō sho, and, except on the northern side, is fringed by rocks; a reef extends about 8 cables south-eastward from its southern side. The channel between Shōkōtō sho and Kōtō sho is deep; vessels using it should keep in mid-channel, so as to avoid the rocks and shoals lying within about a quarter of a mile of the south point of Kōtō sho.

Chart 1968.

Coast.—Taitō hakuchi.—Light.—Pinan or Taitō gai is situated about 27 miles north-north-eastward of the mouth of the Taibu kei (page 190), and is the seat of the Taitō Prefecture and Sub-prefecture; in 1935 the population was 14,634. The Pinan taikei flows through the Pinan plain and enters the sea close north-eastward of the town.

The coast in this vicinity is steep-to, and half a mile offshore there are depths of over 40 fathoms (73m2); there is only a small area immediately off the town, up to about 3 cables offshore, where the depths are suitable for anchoring. Rigyo san, a hill which rises to an elevation of 246 feet (75m0) at the western end of the town, is a useful mark when making the roadstead, and it can usually be identified at a distance of about 15 miles; an electric light on the summit, used for illuminating purposes, is conspicuous at night.

A light is exhibited, at an elevation of 56 feet (17m1), from a white octagonal concrete tower, 27 feet (8m2) in height, situated near the beach at Pinan (*Lat. 22° 45′ N., Long. 121° 10′ E.*).

The best anchorage is with Rigyo san bearing 297°, in depths of from 7 to 13 fathoms (12m8 to 23m8). In the winter, when there is a strong north-east wind, a north-westerly wind always arises in the mornings, which counteracts the effect of the north-east wind and facilitates the landing of cargo. Landing can be effected on the beach nearly half a mile eastward of the lighthouse, but care must be taken, as there is a heavy surf. The tidal streams are affected by the direction of the wind and the north-going current, and sometimes set northward and sometimes southward; although the direction is uncertain, the rate is never great.

There is a W/T station, *see* page 42. There is a Government hospital with accommodation for a small number of patients.

Off-lying island.—Kashō tō, about 17 miles east-south-eastward of Pinan, is a volcanic island with two peaks, 907 and 896 feet (276m4 and 273m1) high, respectively; the island is covered with grass and has only a few trees on it. When there is likelihood of a storm the natives light a fire on the summit of the island so as to warn those who are out fishing; hence the name Kashō tō, which means Bonfire island. The north-eastern extremity of the island is flat, and Rōmon iwa, a peaked rock 151 feet (46m0) high, with a hole in it, lies about 3 cables off this point; about 6 cables east-north-eastward of Rōmon iwa is Tobi iwa, a rock 16 feet (4m9) high. The Kuro shio runs strongly off Bitō kaku, the north-west point of the island, and off Pantuon

Charts 2661b, 1262.

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Chart 1968.

pii, the south-east point; whirlpools are formed over a wide area, and at Pantuon pii the direction of the current is diverted considerably eastward.

There are four villages on the island, with a total population of 1,902 in 1932; the islanders are pure Chinese. The products are peanuts, sweet potatoes, bananas, and lime; cattle are reared, and fish are plentiful. There is only one small stream, on the eastern side of the island; a thermal spring gushes out between the rocks on the south-east coast of the island, and it is said to be specially efficacious for skin diseases.

Nanryō wan is a slight indentation on the west coast of Kashō tō, and its shore is fringed with coral reefs to a distance of nearly one cable in places; close outside these reefs there are depths of from 4 to 5 fathoms (7m3 to 9m1), increasing to 20 fathoms (36m6) from 2 to 4 cables offshore. Although not a good anchorage, the bottom being rock and sand, vessels with local knowledge can obtain temporary shelter even with the strong north-east winds of winter. The best position is about a quarter of a mile offshore, in a depth of 13 fathoms (23m8) with the summit of the island bearing 117°, and the Police station, situated about half a mile south-south-eastward of Bitō kaku, bearing 356°; a rock, with a depth of 2¼ fathoms (4m1) over it, lies nearly 3½ cables southward of this anchorage and 2 cables offshore. The tidal stream always sets northward in this bay, with a maximum rate of about 4 knots, and the anchorage should be approached with the summit bearing 117°. Landing can be effected at a stone mole constructed in a gap in the coastal reef near the Police station, but caution must be exercised when passing through this gap.

Chūryō wan is a slight indentation on the north coast of Kashō tō, between Bitō kaku and a rocky point, 108 feet (32m9) high, nearly 1½ miles eastward; the shore of the bay is a sandy beach fringed by a coral reef about one cable wide. A rock, with a depth of 5¼ fathoms (9m6) over it, lies about 3 cables north-westward of Bitō kaku, with foul ground between it and the point. Two rocks, with depths of 3 and 2½ fathoms (5m5 and 4m6) over them, lie about 4 and 4½ cables, respectively, north-eastward of Bitō kaku. A rock awash lies about three-quarters of a mile northward of the eastern point of the bay; two rocks, with depths of 4 and 3 fathoms (7m3 and 5m5) over them, lie about 2 and 3 cables, respectively, north-westward of this point. Anchorage can be obtained by vessels with local knowledge, about half a mile offshore, in a depth of about 17 fathoms (31m1), sand and rock.

Shinko hakuchi.—Light.—Shinko hakuchi lies about 24 miles north-north-eastward of Pinan, and is open southward, but affords shelter to small vessels with local knowledge from north-easterly winds. A reef, with some rocks above water on it, and a rock awash on its outer end, extends about 3 cables southward from Kayakai bi, the east point of the roadstead, and makes a natural breakwater. A rock, with a depth of 1¾ fathoms (3m2) over it, lies on the western side of the roadstead, nearly 7 cables south-westward of Kayakai bi and about a quarter of a mile offshore. Small vessels can anchor, in a depth of 7 fathoms (12m8), sand, 1½ cables westward of the outer rock, 7 feet (2m1) high, on the reef; large vessels should anchor farther outside. There is a sandy beach on the western side of Kayakai bi, where landing can be safely effected.

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Chart 1968.

A harbour for fishing craft has been constructed on the western side of Kayakai bi; it has a depth of 12 feet (3m7) and is protected by two breakwaters about a cable in length, the entrance between them being about a quarter of a cable wide. An oil tank and an abattoir on the western side of this harbour are conspicuous.

A light is exhibited, at an elevation of 29 feet (8m8), from a red circular concrete pillar, 23 feet (7m0) in height, on the head of the eastern breakwater.

Sansendai.—Light.—Danger.—Sansendai is an islet with three conspicuous rocky peaks lying close off a point about 2¼ miles north-eastward of Kayakai bi; the middle and highest peak is 239 feet (72m8) high. There is no passage between Sansendai and the Formosa coast.

A light is exhibited, at an elevation of 191 feet (58m2), from a white octagonal concrete tower, 8 feet (2m4) in height, situated on Sansendai.

A rock, 2 feet (0m6) high, with a rock awash close off its eastern side, lies about 1½ miles south-westward of Sansendai light-tower and nearly half a mile offshore.

Coast.—Seikō ō hakuchi is a small cove encumbered with reefs situated about 2 miles northward of Sansendai. The entrance is obstructed by reefs, leaving only a narrow passage available for small craft with local knowledge. There are depths of from 7 to 8 feet (2m1 to 2m4) in the northern and southern corners of the cove, and shelter can be obtained here even in the north-east monsoon. Temporary anchorage can be obtained about half a mile off the entrance to the cove, in a depth of 12 fathoms (21m9), sand.

The Shūkoran kei flows out about 21 miles northward of Sansendai, but the entrance is obstructed by sandbanks and there is usually a heavy surf, so that it is impossible for even boats to enter; farther inside, however, it is stated that the river is about one cable wide for a distance of about 10 miles, with depths of over 10 feet (3m0). About one mile northward of the mouth of the Shūkoran kei is an isolated hill 817 feet (249m0) high, named Hokutōkei san, which can be easily identified from a distance; its north-eastern side forms a rocky spur, named Sketikei bi (Chotsui pii).

Karenkō hakuchi.—Light.—Karenkō (Hoirenkan) gai is a small town situated on the coast about 31 miles northward of the mouth of the Shūkoran kei, and had a population of 17,042 in 1935. The Karen kei flows out about 1½ miles southward of the town; a bar extends across the entrance, and there is usually so much surf that it is difficult for boats to enter. Inside the bar there are depths of over 10 feet (3m0). The Beiron kei flows out immediately northward of the town. Beiron san is an isolated hill, 347 feet (105m8) high, about half a mile northward of the town; it stands up well from the flat land in this vicinity, and is a good mark for making the roadstead.

A light is exhibited, at an elevation of 90 feet (27m4), from a white iron column, 33 feet (10m1) in height, at Karenkō (*Lat. 23° 59′ N., Long. 121° 37′ E.*).

Karenkō hakuchi is entirely open, and can only be used as a temporary anchorage; the safest period is from the end of spring to the middle of summer. The depths in the southern part of the roadstead appear liable to change owing to the sand and mud discharged by

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Chart 1968.

the Karen kei. There is good anchorage with the light-structure bearing 309°, distant 6½ cables, in depths of from 9 to 10 fathoms (16m5 to 18m3) sand. Landing can be effected south-eastward of the light-structure, where there is a sandy beach, but even during fine weather this is difficult; during the north-east monsoon there is a strong north-west wind in the early morning, which reduces the waves and renders landing and the discharge of cargo possible.

There is a W/T station (*see* page 42), and the wireless mast is conspicuous from seaward. Small quantities of provisions can be obtained. General storm signals are exhibited on a low hill at the eastern end of the town; *see* page 34.

An artificial harbour, which will accommodate three vessels of 3,000 tons at a time, is under construction about one mile north-eastward of the light-structure, and it is expected that it will be completed in 1939. These works are generally marked by lights at night.

Kirai bi.—Light.—Kírai bi is situated about 3 miles north-eastward of Karenkō. A light is exhibited, at an elevation of 87 feet (26m5), from a white square concrete tower, 25 feet (7m6) in height, situated on Kirai bi.

Coast.—Between Kirai bi and the mouth of the Takkiri kei, about 7½ miles northward, is a bight with depths of over 300 fathoms (548m6) one mile offshore. The flat plain on which Karenkō is situated continues along this part of the coast, but becomes considerably narrower.

Between the mouth of the Takkiri kei and Suō, about 29 miles northward, the depths are great close to the coast, and the mountains rise precipitously from the sea to elevations of from 4,000 to 8,000 feet (1219m2 to 2438m4); the coast is interspersed with patches of conspicuous red cliffs, and on the slopes of the mountains can be seen the scattered huts of the natives. The only flat land along this part of the coast is at the mouths of the three rivers, Taiseisui kei, Taidakusui kei, and Tainano kei, which flow out about 6½, 12, and 20 miles, respectively, northward of the mouth of the Takkiri kei. The coast at the entrance to the Taidakusui kei is sandy; at ordinary times the mouth of this river is a delta of small streams, but after heavy rains it swells to a large estuary.

Nanzankyaku bi is a rocky point about 8½ miles north-north-eastward of the mouth of the Takkiri kei. Just within this point is a somewhat isolated mountain 4,536 feet (1382m6) high, and, as it is seldom obscured by clouds, it can be easily identified. About half a mile northward of the mouth of the Tainano kei is an isolated hill about 200 feet (61m0) high, named Kū san.

Useki bi (Ōcho pii) is a narrow point projecting from the coast about 3½ miles north-eastward of the mouth of the Tainano kei; it has a conical hill, about 300 feet (91m4) high, on its extremity, which appears as an island when seen from the northward. On the northern side of this point is a small bay with a sandy beach and depths of from 8 to 10 fathoms (14m6 to 18m3).

Tidal streams.—The tidal streams off the coast between Taitō hakuchi and Suō wan appear to set south-westward and north-eastward, but practically the only effect is that the rate of the north-going sea current is reduced by the south-westerly set of the tidal stream and increased by the north-easterly set.

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Chart 3658.

SUŌ WAN.—Suō (So ō) wan, entered between Kōkō bi (Kaukau pii), situated about 6 miles northward of Useki bi, and Hokkaku (*Lat. 24° 36′ N., Long. 121° 53′ E.*), about 1½ miles northward, is the only good natural harbour on the east coast of Formosa. As this bay is only open south-eastward, it is the best harbour of refuge during the full strength of the north-easterly winds in winter. During summer, however, with south-easterly winds, long rollers from the south-eastward set into the harbour, and, as there is no outlet for them, they develop into a great tidal wave; small craft have been wrecked in this harbour, and there is even danger for large vessels if they remain inside at such times.

The southern corner of the bay is named Namhō (Namhuhon) wan, and two or three vessels, not exceeding 9 feet (2m7) in draught, can obtain safe anchorage here at all seasons. A fishing harbour has been excavated in the land at the head of Namhō wan, and the earth thus removed has been piled round the sides of the harbour, and re-inforced by a stone wall, so that it is about 10 feet (3m0) above the level of low water; the entrance is protected by two stone moles extending in a north-westerly direction.

Hokuhō (Pakuhon) wan is a small bay in the north-eastern corner of Suō wan, and affords anchorage for one or two vessels in a depth of about 5 fathoms (9m1), sheltered from all quarters except south and south-east.

Dangers.—A rocky ledge extends nearly one cable eastward from Kōkō bi, and a detached rock, with a depth of less than 6 feet (1m8), lies about 1½ cables south-eastward of this point. The coast between Kōkō bi and Bishi tō (Pia tau), nearly 7 cables north-westward, is fringed with rocks, which extend as much as 1½ cables offshore; foul ground extends nearly 2 cables northward from Bishi tō.

Sansentai is a group of rocks lying eastward of Hokkaku; the westernmost and largest of this group is 94 feet (28m7) high and lies about 6 cables eastward of Hokkaku. Foul ground extends about 1½ cables south-eastward of this rock, and a rock, with a depth of 2½ fathoms (4m6), lies about 2 cables south-westward of it. Two rocks, 65 and 37 feet (19m8 and 11m3) high, respectively, lie about 2 cables north-eastward of the largest rock. Sansentai is covered by the *red* sector of Hokkaku light between the bearings of 268° and 303°. Foul ground, on which are several rocks which dry and rocks awash, on which the sea generally breaks, extends about 7 cables north-eastward and 5 cables east-north-eastward from Hokkaku. There is a channel, with depths of from 7 to 12 fathoms (12m8 to 21m9), between the foul ground and Sansentai, but it is not recommended owing to the rocky and irregular nature of the bottom. There are several rocks off the coast between Hokkaku and Hokuhō bi (Pakuhon pii); the outermost of these lies nearly 1½ cables offshore.

Chūshin tō (Chonshimutau) is a large coral reef lying nearly in the middle of Suō wan; there are several rocks above water on it, and the highest of these, 28 feet (8m5) high, lies about 4 cables north-north-westward from Bishi tō. This reef breaks the force of the sea, and small vessels can find safe anchorage under its lee; one vessel has weathered out a typhoon here. The passage between Chūshin tō and Bishi tō is unsafe. Numerous rocks lie between Chushin tō and the shore of the bay south-westward. Serpent rock, with a depth

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Chart 3658.

of 2 fathoms (3m7) over it, lies about 1½ cables north-westward of the highest rock on Chushin tō.

A rock, with a depth of less than 6 feet (1m8) over it, lies about 4½ cables north-westward of the highest rock on Chushin tō; foul ground extends nearly 2 cables from the shore northward of the former rock.

Lights.—Buoys.—A light is exhibited, at an elevation of 184 feet (56m1), from a white square concrete structure, 18 feet (5m5) in height, on Hokkaku (*Lat. 24° 36′ N., Long. 121° 53′ E.*).

A light is exhibited on the western mole at the entrance to the fishing harbour at the head of Namhō wan. There is a beacon on the eastern mole.

A light is exhibited on the southern side of the mouth of the Shūtō kei, which flows into the head of Suō wan.

A cylindrical light-buoy, painted black, exhibiting a *white flashing* light *every two seconds*, is moored off the northern side of Serpent rock. The light on this buoy is reported to be extinguished sometimes by heavy gales.

There is a mooring buoy about one cable south-westward of Serpent rock.

Anchorage.—There is anchorage in the outer part of Suō wan, in a depth of about 12 fathoms (21m9), fine sand, with the highest rock of Chūshin tō bearing 278°, and Kōkō bi bearing 178°; this anchorage is sheltered from all winds except easterly, when it is unsafe.

In winter landing is always very difficult. During summer there are numerous calm days, and boats can easily land on the shore; when, however, there is a strong south-east wind in the early morning there is such a heavy sea on the shore that communication is impossible, and landing can then be effected in Namhō wan or Hokuhō wan.

The tidal streams along the coast set northward with the rising tide, and southward with the falling tide; both have a maximum rate of about 1½ knots.

Suō.—Suō is situated a short distance within the shore at the head of the bay and on the banks of the Shutō kei, and had a population of 15,889 in 1935.

The mouth of the Shūtō kei is continually changing, and at low water it is difficult for even small boats to enter; at high water, however, small craft can enter easily and discharge cargo within the mouth. There are long sandy beaches on both sides of the entrance, affording good landing for boats. When landing inside the river mouth boats should use the right bank, as there is a good road to the town from that side.

Harbour facilities.—Fresh provisions in moderate quantities can be obtained at Suō.

Suō is connected by railway to Kīrun, and thence to the railway system on the western side of Formosa.

Local storm signals are displayed from a mast on the northern side of the town; *see* page 38.

COAST.—The coast between Hokkaku and the mouth of the Toi ka, about 15½ miles northward, consists of a sandy beach with sand dunes about 20 feet (6m1) high; behind the sand dunes are broad,

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Chart 3658.

fertile, irrigated plains under cultivation. The Burōkō kei flows out about 3 miles north-westward of Hokkaku, but its entrance is narrow and shallow, and is only available for small craft at high water.

The entrance to the Tōkō kō lies nearly 7 miles northward of Hokkaku, and is the estuary of the three rivers Tōzan kawa, Dakusui kei, and Giran kawa; it is stated to be about one cable broad, with depths of from 2 to 3 feet (0m6 to 0m9), but the depths and the position of the river mouth often change as the result of floods or the action of the sea. Junks can enter the river at high water and proceed to Tōkō, a village about three-quarters of a mile within the mouth. A flat-topped sand dune on the northern side of the entrance, and the masts of junks at anchor inside the river, are good marks when approaching the entrance.

The Tōi ka flows out about 8 miles northward of the mouth of the Tōkō kō, and has depths of from one to 2 feet (0m3 to 0m6), but owing to the strong stream and heavy surf it is frequently difficult for junks to enter even in fine weather and at high water. The town of Tōi is situated about three-quarters of a mile up the river.

Off-lying island and danger.—Kisan (Kūsoan) tō lies about 6 miles eastward of the mouth of the Tōi ka, and rises to a conical peak 1,335 feet (406m9) high; there are steep cliffs all round the island, except for portions of the east and west coasts. When seen from the northward or southward it resembles a tortoise facing eastward; on Kitō gan (*Lat. 24° 50′ N., Long. 121° 58′ E.*), the east point, is a pointed summit 791 feet (241m1) high, representing the head of the tortoise, and from the western end of the island a pebble bank extends about half a mile north-westward, representing the tail. Kisan tō is an active volcano, and white vapour may be seen issuing from two or three places on the south coast; sulphur rising from the bed of the sea southward of the western extremity of the island may cause a whitish discoloration of the water. There is a village on the western side of Kisan tō, and the inhabitants are occupied in fishing and agriculture. There is a lake on the eastern side of the island. Temporary anchorage can be obtained, in depths of less than 11 fathoms (20m1), sand, about 2 cables northward of the pebble bank extending from the western side of the island; the tidal streams here are inappreciable.

Kiran iwa, about 2¼ miles southward of the western extremity of Kisan tō, is a flat-topped rock 27 feet (9m2) high; there are three rocks, which dry, close off its western side and it is steep-to all round.

Coast.—Light.—A short distance northward of the mouth of the Tōi ka the mountains approach the coast, which is steep and rocky to Sanchō kaku, the north-east point of Formosa and about 14 miles north-eastward of the Tōi ka. Sanchō (Samuchō) kaku rises to a plateau, on the southern side of which is a sharp peak 546 feet (166m4) high; about half a mile south-westward of this peak is a hill 677 feet (203m3) high, and about three-quarters of a mile westward of the latter is a mountain 1,455 feet (443m5) high. All of these are conspicuous and are good landmarks for identifying the cape from a distance.

A rocky ledge extends about 2 cables from Sanchō kaku, and there is a tidal race for about 1½ miles offshore; the cape should, therefore, be given a good berth. Uō wan is a small bay on the northern side of Sanchō kaku, and it affords shelter to small vessels with local

Charts 1968, 2412, 1262.

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Chart 3658.

knowledge with westerly winds; the depths decrease gradually from 11 fathoms (20m1) at the entrance, but rocks, which dry, extend for a short distance from the western shore. Uō village is situated at the head of this bay.

A light is exhibited, at an elevation of 330 feet (100m5), from a white circular concrete structure, 40 feet (12m2) in height, on Sanchō kaku.

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CHAPTER V.

RAGGED POINT TO NIMROD SOUND.

Chart 1988.

COAST.—Rag islands.—The easternmost of the three Rag islands lies about 3 miles north-westward of Ragged point (page 122); anchorage can be obtained by vessels with local knowledge westward of the western island, but the depths appear to be very irregular. A rock, with a depth of 5 fathoms (9m1) over it, lies abut half a mile westward of the western Rag island. Bittern rock (*Lat. 26° 26′ N., Long. 119° 55′ E.*), which dries, lies about one mile northward of the eastern island.

The tidal streams off Ragged point and amongst the Rag islands are rapid, sometimes attaining a rate of 3 knots. Fishing stakes may be encountered extending north-eastward from the eastern Rag island.

Loyüan bay.—The entrance to Loyüan bay lies between South point, about 7 miles north-westward of Ragged point, and Mouth point, about one mile northward. Within these points the entrance channel extends for about 4½ miles in a south-westerly direction; it is deep, and its steep shores are about a mile apart; the bay then opens out, and, except for two narrow channels in a north-westerly and southerly direction, respectively, becomes very shoal. Loyüan bay affords anchorage in a typhoon.

Half-tide rocks lie within 1½ cables from a point on the northern shore situated about one mile south-westward of Mouth point. Cromlech head, a prominent headland southward of Half-tide rocks, is steep-to, but there are tide rips off it. Twin islets lie in mid-channel about one mile south-westward of Cromlech head, and are almost connected to each other. Snake islet lies close off the southern shore about 1¾ miles south-westward of Cromlech head; Achin head is about 2½ miles south-westward of Snake islet, with Green islet about midway between and on the edge of the coastal bank.

Fushow channel, the entrance to the north-western arm of the bay, lies between Sunset island, situated about 1¾ miles westward of Snake islet, and the coast north-eastward; a rock, with a depth of 5 fathoms (9m1) over it, lies nearly in the middle of this channel. Friday island lies about half a mile north-westward of Sunset island.

There is anchorage, in depths of from 7 to 8 fathoms (12m8 to 14m6), about 6 cables southward of Sunset island. Anchorage can also be obtained in the north-western arm of the bay, in depths of

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Chart 1988.

from 6 to 10 fathoms (11m0 to 18m3), about half a mile north-north-eastward of Friday island; small vessels can anchor off the north-eastern shore of this arm, up to a distance of about 6 miles north-westward of Friday island, in a depth of not less than 4 fathoms (7m3).

PORT OF SAN-TU-AO AND APPROACHES.—Islands and dangers in the approach.—There are several islands and dangers in the approach to the Port of San-tu-ao (Santu inlet).

Black rock, about 6½ miles eastward of Ragged point, has been described on page 125; a rock awash (chart 1754) lies about 6 miles east-north-eastward of Black rock.

Cony island, nearly 11½ miles north-eastward of Ragged point, rises in a cone to an elevation of 742 feet (226m2); a reef extends about 3 cables northward from its north point. A rock awash lies about 3 cables eastward, and a similar rock lies fully one mile south-eastward of the island; a 5½-fathom (10m1) patch lies about half a mile westward of the latter rock.

Siyang shan or Spider island lies with its north-eastern extremity about 3½ miles west-north-westward of Cony island. Three islets lie close together a short distance off the eastern side of Spider island, and some rocks and islets lie off the northern side of the island.

Larva rocks consist of several rocks above water and some rocks awash; the south-eastern rock lies about 1½ miles westward of the south-west point of Spider island.

Light.—A light is exhibited, at an elevation of 142 feet (43m3), from a white circular tower, 53 feet (16m2) in height, situated on the southernmost of the three islets (*Lat. 26° 30′ N., Long. 120° 04′ E.*) off the eastern side of Spider island; the keepers' dwelling is white. *Charts 2292, 1988.*

Port of San-tu-ao.—General remarks.—The entrance to the Port of San-tu-ao, between the coast northward of Loyüan bay and the south-western end of the peninsula of Tung chung, is about 1½ miles wide. At the inner end of the entrance channel the inlet opens out into a basin, encumbered by islands, from which several arms extend. Waterwitch channel to the westward leads to San-tu anchorage, beyond which are shallow channels leading to Ningteh (Nintai), the principal town in this neighbourhood; a deep channel leads north-eastward of Ching san, and about 5 miles north-north-westward of that island is divided into three narrow channels named Somerville, Weigall and Trinity channels; north-eastward of the inner end of the entrance channel are Algerine roads, and farther north-eastward is Sam sa basin, the two being connected by Bowring channel.

The port of San-tu-ao affords anchorage in a typhoon. With easterly winds and a strong out-going stream vessels of much draught become tide-rode, particularly during the intervals between the heavy squalls, and a nasty sea sets in; the holding ground is good.

The land around the inlet is well cultivated and the hills are terraced. Two rivers flow into the northern side of the inlet; the eastern of these leads to the village of Sieng dieng, the seaport of Funing fu, which is situated about 8 miles eastward and overlooks Funing bay; the western river leads to Fuan fu.

Entrance channel.—Island and dangers.—Beacon.—The western side of the entrance, between Steep point, situated about

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Charts 2292, 1988.

2 miles northward of Mouth point, and Town point, about 4½ miles farther northward, is rugged and indented by several inlets, mostly filled with mud flats. Deng o is a bay immediately southward of Town point; there is a village on the northern side of a stream which flows into the south-western corner of the bay.

Mount Foster, about midway between Steep point and Town point, is a conspicuous sharp summit. Johnston ranges, a little farther inland, are rugged, many of the summits being inaccessible; the valleys between the ranges are cultivated. Alacrity range, westward and north-westward of Deng o, is high and broken, Mount Underwood, about 5 miles westward of Town point, being the highest peak; Mount Three Crags, about 2½ miles north-eastward of Mount Underwood, has three sharp crags on its summit. Town point is the steep-to extremity of a peninsula rising to its greatest elevation in Mount Davy, about 2 miles north-westward of the point.

Chart 2292.

Chown point (*Lat. 26° 31′ N., Long. 119° 53′ E.*), about 4 miles north-eastward of Steep point, is the southern extremity of the peninsula of Tung chung and the eastern entrance point to the Port of San-tu-ao. The coast between Chown point and Castle point, about 3 miles west-north-westward, is rugged and steep-to; the tidal streams are felt but little near the greater part of this coast. Castle point is steep-to; a bay on its south-eastern side is filled with mud. The tidal streams off this point attain a rate of from 4 to 7 knots, and there are generally heavy tide-rips off it, especially with the outgoing stream. The coast between Castle point and Ridge point, about 3½ miles northward, is indented with inlets which are filled with mud flats; there are villages at the head of each inlet and the valleys behind are cultivated. Fort bay, with a village on its southern shore, is the second bay northward of Castle point. Mount Hsing ting, about 1½ miles eastward of Castle point, has a flat top, on which are several large boulders.

Channel rock, about 6 cables westward of Castle point, dries 14 feet (4^{m}3); an iron beacon, surmounted by a sphere, 12 feet (3^{m}7) in height, stands on this rock. The highest peak of Ching san (page 202) in line with Hail point, the western extremity of Cone island, bearing 336°, leads in mid-channel between Channel rock and Castle point; this leading line leads over the rock, with a depth of 5 fathoms (9^{m}1), lying about half a mile westward of the western Rag island (chart 1988).

Cone island lies with Hail point, its western extremity, about one mile northward of Town point, and has a rugged appearance; some rocks, which dry from 2 to 18 feet (0^{m}6 to 5^{m}5), lie close off its north coast. Steeple rocks, 60 feet (18^{m}3) high, lie about 1½ cables off the south-east point of the island, and some rocks, which dry 25 feet (7^{m}6), lie about the same distance south-south-eastward of Steeple rocks.

An islet, 160 feet (48^{m}8) high, lies about 8 cables eastward of Cone island and close off the eastern side of the entrance; a rock, 4 feet (1^{m}2) high, lies about a quarter of a mile northward of this islet.

The channel westward of Cone island is deep and clear, and the points on either side are fairly steep-to; at spring tides the tidal streams may attain a rate of from 6 to 7 knots, and there are tide-rips and swirls off Hail point.

Charts 1761, 1754, 2412, 1262.

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Chart 2292.

Aurora channel, eastward of Cone island, is also deep.

Waterwitch channel.—Dangers.—Buoy.—Ching san, which forms the northern side of Waterwitch channel, is the second largest island in the Port of San-tu-ao, and lies with its southern extremity nearly 2½ miles north-westward of Hail point; it has several peaks of nearly the same elevation, the highest, 1,265 feet (385m1), lying in the western part. Ngu uong island is separated from the eastern part of the southern side of Ching san by a channel about 3½ cables wide, which affords anchorage for junks. A rocky islet, 105 feet (32m0) high, lies on the outer edge of a shoal which extends about half a mile eastward from Ngu uong island.

The coast of the mainland, which forms the south-western side of Waterwitch channel, is indented by numerous inlets filled by mud flats.

The south-eastern part of Waterwitch channel is free from dangers, except for Vivian rock, with a depth of 1½ fathoms (2m7) over it, which lies about 2½ cables south-eastward of the south point of Ching san. There are several islets and dangers in the north-western entrance of the channel. Foul ground, with very irregular depths, extends about 3 cables from the south-west coast of Ching san; Pillar rocks, which lie about 3 cables off this coast, are granite boulders 20 feet (6m1) high, and a ledge of flat rocks extends about one cable south-westward from them, the outer extremity being awash. Diver islet is situated about 4½ cables westward of Pillar rocks, and is the outermost of a group of islets lying on the south-western side of the channel; a group of rocks, one of them being one foot (0m3) high, lies about one cable northward of Diver islet.

Kaiser rock, about 5½ cables north-westward of Diver islet, is just awash at lowest low water and is steep-to; it is marked by a black conical buoy. The tidal streams eddy round this rock at a great rate. The north-east point of Cone island in line with the south-western side of Ching san, bearing about 125°, leads about 2 cables north-eastward of Kaiser rock.

The fairway of Waterwitch channel is deep; in the narrowest part, between Diver islet and the rocky ledge which extends from Pillar rocks, the tidal streams are strong and there are tide-rips and swirls; the out-going stream sets towards Diver islet (*Lat. 26° 37′ N., Long 119° 45′ E.*).

San-tu anchorage.—Dangers.—San-tu anchorage lies between the western part of San-tu island and the mainland southward, and has depths of from 5½ to 17 fathoms (10m1 to 31m1).

Apex point, on the southern side of the anchorage and nearly 4 miles westward of Diver islet, is the north-western extremity of a bluff which rises to an elevation of 878 feet (267m6); on the southern side of the bluff is Cascade bay, a mud creek, at the head of which is a small river fed from a waterfall 300 feet (91m4) high. The village of Wan yao is situated about 1½ miles south-westward of Apex point.

San-tu island, the largest island in the Port of San-tu-ao, lies with King point, its south-western extremity, about 1½ miles north-north-westward of Apex point; the island is well populated, wooded and cultivated. Mount MacAllum, its highest peak, is situated in the north-western part of the island. Mud flats extend as much as 1½ miles from the south-east coast of the island, and Mud islet lies on

Charts 1988, 1754, 2412, 1262.

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Chart 2292.

their eastern edge. Customs point, about 4 cables eastward of King point, has a Chinese Custom house on it. Storm signals are displayed from the flagstaff of the Custom house; *see* Supplementary storm signals (page 33). There is a stone jetty and a pier at Customs point.

Lay rocks are a group of rugged rocks which dry about 20 feet (6m1); a rounded boulder, 3 feet (0m9) high, lies on their southern edge and nearly 2½ cables south-eastward of Customs point. At low water these rocks appear like a small island; there are irregular depths for about a quarter of a mile westward and south-westward of them.

Olive island lies about 6½ cables westward of King point and on the south-eastern extremity of Sheldrake flats. Sampan islet lies nearly one mile northward of King point and on the edge of the mud flat which extends from the west coast of San-tu island.

The best position for anchoring is about half a mile south-eastward of Customs point, in depths of from 8 to 10 fathoms (14m6 to 18m3), with King point just open northward of Lay rocks, bearing 293°, and Mount Stevens, situated about 1½ miles eastward of King point, bearing 043°. A submarine cable crosses the channel between Customs point and Apex point.

San-tu is connected with the general telegraph system. There is steamer communication with Foochow.

Chart 1988.

Ningteh and approaches.—Fe lo on, a village about 5 miles south-westward of Apex point (*Lat. 26° 37′ N., Long. 119° 40′ E.*), is situated on a creek with mangroves at the head, and Nedu village is about 2 miles north-north-westward of Fe lo on. Ningteh (Nintai), a walled town, is situated about 4½ miles north-westward of Nedu, and can be reached from San-tu anchorage by two channels through the mud flats which almost fill that portion of the Port of San-tu-ao which lies westward of Apex point. Pagoda creek, the southern of these two channels, is only navigable by boats one hour after low water; Ningteh (Nintai) channel, the northern, is wider and deeper, and is used by junks, but the western part is no deeper than Pagoda creek, and junks always ground off Ningteh.

Pagoda island lies about one mile eastward of Ningteh and has a pagoda, 60 feet (18m3) in height, on its summit. The southern side of the island is connected to the mainland by a causeway, and on the northern side are the remains of an old causeway curving northward; the area thus enclosed is filled up with mud. Two islets lie north-eastward of Pagoda island and on the southern side of Ningteh channel. The two Hump islands lie about one mile south-eastward and one mile southward, respectively, of the eastern end of Pagoda island; they lie, with Pagoda island, on the mud flat separating Pagoda creek from Ningteh channel, and this flat extends about 3 miles eastward from them, under the name of Tongue flat.

Spider island, on the northern side of Ningteh channel, is extensively cultivated and it contains many villages, the largest being Tung wan and Parquan. Red hill rises at its south-eastern end.

Chart 2292.

Algerine roads.—The north-west coast of the peninsula of Tung chung between Ridge point (page 201) and Plover point, about 4 miles north-eastward, is slightly indented, and wooded spurs from De la Garde range, which rises a short distance inland, descend steeply

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Chart 2292.

to the coast. Four islets lie on the mud flat which extends about 2 cables from the coast midway between Ridge point and Plover point, and a rock, with a depth of $1\frac{3}{4}$ fathoms (3^m2), lies about $2\frac{1}{2}$ cables north-westward of the north-eastern islet. A brownish islet, 20 feet (6^m1) high, from which a rocky reef extends about $1\frac{1}{4}$ cables north-eastward, lies $1\frac{1}{2}$ cables north-westward of Plover point; a rock, 6 feet (1^m8) high, lies about three-quarters of a cable north-eastward of the point.

The peninsula of Tung chung is rugged and broken in character, and masses of granite are piled up on the hills; it is connected to the mainland by a narrow, hilly isthmus.

Algerine roads, westward of Plover point, afford good anchorage; this is the best position in the Port of San-tu-ao to ride out a typhoon.

Foul point (*Lat.* 26° 39′ *N.*, *Long.* 119° 52′ *E.*) is situated on the northern side of the roads and about $2\frac{1}{4}$ miles north-westward of Plover point; the Slade range runs northward from Foul point. A small islet lies close off the point, and foul ground extends nearly 4 cables southward from the islet; another islet, with a rock 14 feet (4^m3) high off its western side, lies about half a mile eastward of the point.

Sam sa basin and approaches.—Spike hill, nearly $3\frac{1}{2}$ miles north-eastward of Plover point, is situated on the south-western extremity of an island nearly connected to the coast. A broad mud flat, with a well defined outer edge, extends from the coast between Plover point and this island; there are several islands on this mud flat.

The Blackburn islets, four in number, lie about half a mile outside the edge of the above-mentioned mud flat; the south-western and largest islet, 78 feet (23^m8) high, lies about $1\frac{1}{4}$ miles north-eastward of Plover point, and the north-eastern islet, 55 feet (16^m8) high, lies about three-quarters of a mile west-south-westward of Spike hill. Low island lies with its eastern extremity about $1\frac{3}{4}$ miles westward of Spike hill; a rock, 40 feet (12^m2) high, with foul ground extending about 3 cables north-eastward, lies about one mile west-south-westward of the north-west point of the island. There is a safe channel northward of Low island, and also between this island and the Blackburn islets.

Sibbald island lies with its south-eastern extremity about $1\frac{1}{4}$ miles north-westward of Spike hill; an islet, with a flat extending about one mile south-south-westward, lies close off the eastern side of the island.

Charts 2292, 1988.

Sam sa basin, the extreme north-eastern part of the Port of San-tu-ao, is entered through Bowring channel, which lies between the islet and flats off the eastern side of Sibbald island and the coast eastward; Bowring channel is clear except for a rock, 7 feet (2^m1) high, lying about three-quarters of a mile eastward of the south-east point of Sibbald island. Mount Alton, on the eastern side of the channel, is conspicuous.

Mud flats and shoal water extend for a considerable distance off the greater part of the shores of Sam sa basin, but there are depths of over 5 fathoms (9^m1) in the middle part for about 3 miles within the entrance.

Charts 1988, 1754, 2412, 1262.

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Charts 2292, 1988.

Northern part of the Port of San-tu-ao.—Between Foul point and Jonas point, about 4 miles north-westward, is a bight with mud flats extending from its shores, and these completely fill Werner bay, situated at the head of the bight; Kouang village is situated at the head of Werner bay. Grand range, on the northern side of Werner bay, is imposing, and Mount Pudsey Dawson, its highest part, has three distinct summits; about 3½ miles north-eastward of the head of Werner bay this range connects with the Slade range, and between them is a deep, cultivated valley.

Ma chui, separated from Jonas point by a channel about 1½ cables wide, is a barren island, and near its north-western end is a conical hill, 682 feet (207m9) high; a small islet, 24 feet (7m3) high, lies close off the east point of the island, and a mud flat extends about 3 cables southward from this islet.

Ba bu san is separated from the north-western end of Ma chui by a deep channel about 2 cables wide; a bank, with depths of less than 3 fathoms (5m5), extends nearly one mile northward from the island, but there is a deep channel between the eastern edge of this bank and the flats extending from the coast eastward. The channel between Ba bu san and the eastern end of San-tu island is clear and deep.

Ford point (*Lat. 26° 42′ N., Long. 119° 44′ E.*) is situated about 2¾ miles north-westward of the south-western extremity of Ba bu san, and a bank extends about three-quarters of a mile southward and about 1½ miles eastward from it. The Crescent range forms the promontory of which Ford point is the south-eastern extremity, and its southern face is rocky and precipitous.

Chart 1988.

Trinity, Weigall, and Somerville channels.—Trinity channel and Weigall channel are separated by a promontory formed by Pinnacle range, of which Thames point, situated about 2 miles north-north-eastward of Ford point, is the southern extremity; Pinnacle range has a number of sharp peaks, and Mount Star, about three-quarters of a mile northward of Thames point, is its highest summit.

Trinity channel runs in a northerly direction to Tree islet, situated about 3 miles north-north-eastward of Thames point, and then divides, the eastern branch being narrow and becoming gradually absorbed in the mud flats filling the bay north-eastward; the western branch narrows when about 2½ miles northward of Tree islet, and is almost blocked by mudbanks, but there is a channel, with depths of from 6 to 9 feet (1m8 to 2m7), nearly to the village of Sieng dieng, 8½ miles above Tree islet.

Weigall channel leads between Thames point and Tay point, about 6 cables south-westward, into the Fuan river, which flows some 25 miles northward to Fuan fu. The channel is deep, but northward of the point situated about one mile north-westward of Thames point the fairway becomes narrow, and the depths decrease to about 4 fathoms (7m3).

Somerville channel is entered between the shoals which extend about three-quarters of a mile southward from Ford point and the northern edge of San-tu bank, which extends from the northern side of San-tu island; Elbow islet lies at the eastern end of San-tu bank and nearly 1½ miles south-south-eastward of Ford point. Peak islet lies about 2 cables off the middle of the north coast of San-tu

Charts 1754, 2412, 1262.

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Chart 1988.

island. The channel approaches the coast at Esk point, situated about 1¼ miles westward of Ford point, and thence runs fairly close along this coast to Bold point, nearly 2¼ miles north-westward of Esk point. Beyond Bold point the channel continues along the northern side of Grieve island, which lies close northward of Spider island, and then opens out to a bay, which has only been partially examined, but the entrance to which is almost blocked by an island named Pa sui san.

Sheldrake flats extend eastward from Spider and Grieve islands, leaving a channel about half a mile wide between them and the flat which extends from the western side of San-tu island; two creeks, with a joint entrance from this channel, lead to the villages of Tung wan and Parquan, respectively, and between the two creeks is Flat island. Grieve island has a sharp peak, 1,040 feet (317m0) high, on its south-western part; two islets lie off its eastern extremity, and southward of them are the two Hecla islands.

Charts 2292, 1988.

Directions for the Port of San-tu-ao.—The Port of San-tu-ao is easy of access in all weathers, but with strong north-easterly winds a heavy sea rolls in through the entrance, and with the out-going stream there are heavy tide-rips.

Vessels bound for the Port of San-tu-ao should pass midway between the Rag islands and Spider island and then steer for the entrance. Channel rock may be passed on either side; the summit of Ching san in line with Hail point, bearing 336°, leads eastward of it. Castle point is steep-to, and there are generally heavy tide-rips off it, especially with the out-going stream. Cone island may be passed on either side, but it is reported that Aurora channel is more suitable for vessels with a large turning circle.

Vessels making for San-tu anchorage, when past Hail point, should steer a mid-channel course through Waterwitch channel, passing between Diver islet and the rocky ledge extending south-westward from Pillar rocks and thence north-eastward of Kaiser rock. After passing Kaiser rock course may be shaped as requisite for the anchorage, bearing in mind that the shoalest part of the channel, with a least depth of 4¾ fathoms (8m7), lies southward of Hecla point (*Lat. 26° 38′ N., Long. 119° 43′ E.*), the south-east point of San-tu island. Vessels anchoring westward of Lay rocks must pass well clear southward of these rocks. The in-going tidal stream tends to keep a vessel in the middle of the channels, but when entering with the out-going tidal stream care is necessary when passing Castle point, Hail point, and between Diver islet and Pillar rocks, as that stream sets strongly on to the starboard bow.

Tidal streams.—The tidal streams turn at the times of high and low water on the shore, and, in the entrance channel, may attain a rate of from 4 to 7 knots, according to the age of the moon; they follow the directions of the channels, dividing where there are islands and running at a greater rate past their salient points. The stream entering the inlet divides southward of Cone island, one branch passing through Aurora channel into the broad parts of the inlet, and the other following Waterwitch channel to San-tu anchorage.

Fishing stakes.—In 1931, when approaching the Port of San-tu-ao from the eastward, H.M.S. *Cornflower* observed a line of fishing

Charts 1754, 2412, 1262.

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Charts 2292, 1988.

stakes extending in a north-easterly direction for a distance of about 7 miles from a position about 2 miles north-eastward of Ragged point (*Lat. 26° 23′ N., Long. 119° 57′ E.*).

Numerous large nets are placed in the inlet and its approach; Waterwitch channel is at times almost completely blocked by fishing boats and nets. The nets are moored by heavy baskets of stones, and the net poles show in groups some feet above water; these should be avoided, as the mooring-ropes are very strong.

Chart 1988.

COAST.—Islets and dangers.—The coast between Chown point (page 201) and Cox point, about 4 miles north-eastward is rugged; the coast between Cox point and Stone point, about 11 miles north-eastward, has only been partially examined.

Inside islet lies about 1½ miles east-south-eastward of Cox point, and there are charted depths of from 4½ to 8 fathoms (7m8 to 14m6) in the channel between. Isthmus island lies with its south-western extremity nearly 1½ miles south-eastward of Inside islet, and is divided into two parts by a sandy isthmus; a mud bank, with depths of less than 3 fathoms (5m5) extends about half a mile south-westward from the island. The northern part of the channel between Isthmus island and Inside islet is obstructed by a reef, some rocks on which dry from 5 to 6 feet (1m5 to 1m8). A third islet lies about one mile south-eastward of Isthmus island, and there appears to be a clear channel between. Cony island and Spider island have been described on page 200.

Huying shan or Double Peak island lies with its southern extremity about 6½ miles eastward of Isthmus island; it has two remarkable peaks near its north-eastern end, the hghest being 1,190 feet (362m7) high. Channel rock lies nearly three-quarters of a mile north-westward of the west point of Double Peak island, and a rock above water lies about one cable off the north-west coast of the island and nearly one mile eastward of Channel rock. There are depths of less than 5 fathoms (9m1) for nearly one mile south-westward of Double Peak island. Na geu seu and Ma chick are two hilly islands close off the southern end of Double Peak island, but they have not been thoroughly examined. In the north-east monsoon good anchorage can be obtained south-westward of Double Peak island, sheltered from easterly swell by Ma chick and Na geu seu.

The passage between the shoal which extends south-westward from Double Peak island and the islets and rocks close off the north-eastern end of Spider island (page 200) appears to be clear, but a depth of only 4½ fathoms (8m2) was reported, in 1935, about 1½ miles westward of the western extremity of Double Peak island, where the chart shows depths of 6 fathoms (11m0).

Seaon channel, between Double Peak island and the coast northwestward is deep and clear. Flat island lies about 2½ miles southwestward of Stone point and 4 cables offshore, and is low and flat; a rock above water and a sunken rock lie close off its south-west point. There is a small islet between Flat island and the coast, and this passage should not be attempted. In the north-east monsoon small vessels with local knowledge can obtain sheltered anchorage off a sandy bay in the coast about 1½ miles north-westward of Flat island.

Charts 1754, 2412, 1262.

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Chart 1988.

Between Stone point and Goodridge point, about 4½ miles northward, the coast forms a bay which has been only partially examined. Bittern island lies near the head of the bay; there is a small sandy cove westward of the northern part of the island, and a small vessel with local knowledge can obtain sheltered anchorage in either monsoon, in a depth of 3½ fathoms (6m4), between the cove and the island. As dangers may exist in the bay, great caution must be exercised. Some islets lie off Stone point and Goodridge point.

Fielon island lies close off a point about 4½ miles northward of Goodridge point, and between this island and Goodridge point are several islets and rocks, the positions of which are best seen on the chart.

Chart 1754.

Outlying islands.—Piseang or Tsi sing islands are a group of islets and rocks, the southernmost of which, Bare rock (*Lat. 26° 38′ N., Long. 120° 19′ E.*), lies about 10 miles eastward of Stone point; the westernmost rock lies nearly 3 miles north-westward of Bare rock. Country island, the south-eastern islet, is about 400 feet (121m9) high. A reef, on which is a rock drying 6 feet (1m8), extends about half a mile north-eastward from the eastern islet, and is marked by breakers. Town island, the northern and largest island of the group, lies about 3 miles northward of Country island; a small cove on its south-western side affords shelter to small vessels.

Charts 1988, 1754.

Funing bay.—Funing bay is entered between Fielon island and a point about 7 miles north-north-eastward; it has been only partially examined, but it appears to be very shoal, and there are several islets and rocks in it. Funing fu is situated at the head of the bay. A group of islets lies in the northern part of the bay, and Fong ho, situated about one mile southward of the northern entrance point, is the south-eastern and largest of these. Sansha village, a large local fishing centre with a population of over 1,000 in 1931, is situated near the northern entrance point.

Good anchorage has been obtained off Sansha village, in a depth of 4½ fathoms (8m2), with the northern entrance point of the bay bearing 043°, distant 3½ cables. In 1931 H.M.S. *Sepoy*, after passing half a mile northward of Fong ho on a westerly course, approached the anchorage off Sansha village steering 003°, with Sansha islet, lying close offshore and having a ruined castle on its summit, just on the port bow.

Chart 1754.

Fu yan and adjacent islands.—Fu yan is the easternmost and largest of a group of islands extending for a distance of about 10 miles eastward from the northern entrance point of Funing bay. Angle island, the westernmost of the group, is separated from the mainland by Little pass, a narrow passage, somewhat obstructed by rocks, with a least depth of 3 fathoms (5m5) in the fairway. There is a good typhoon anchorage, for one vessel, in a depth of 9 fathoms (16m5), in the southern part of Little pass.

Chupi island, eastward of Angle island, is separated from that island by Chupi pass, about one mile wide, but in the southern part the navigable passage is reduced to half that width by a group of low rocks lying about half a mile south-eastward of Angle island. Sugarloaf islet lies close off the southern side of Chupi island.

Charts 2412, 1262.

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Chart 1754.

Fu yan is separated from the eastern end of Chupi island by Fu yan pass, a narrow passage with depths of from 7 to 9 fathoms (12m8 to 16m5); heavy squalls from the high land and strong eddies render this passage less desirable than the others, and it is also much obstructed by fishing stakes. Large numbers of fishing stakes extend northward and north-westward from the north coast of Fu yan.

In 1906, H.M.S. *Alacrity* obtained soundings of 7 fathoms (12m8) about 3 miles south-eastward of Fu yan. Depths of 3 fathoms (5m5) were reported, in 1908, northward of Chupi island and between Fu yan and the mainland, where the chart shows depths of about 5 fathoms (9m1). In 1931, H.M.S. *Sepoy* reported less depths than charted about 2 miles northward of Fu yan, over an area with a radius of about one mile.

There is reported to be good anchorage, in a depth of 6 fathoms (11m0), sand, about one mile westward of Fu yan; H.M.S. *Sepoy* obtained good anchorage, in a depth of 6 fathoms (11m0), with the east point of Fu yan bearing 180°, distant one mile.

Outlying islands and dangers.—Light.—The westernmost island of the Incog group of islands and rocks lies about 5 miles north-eastward of the east point of Fu yan; the eastern and largest of the group is 150 feet (45m7) high. In the north-east monsoon anchorage can be obtained, by vessels with local knowledge, in a depth of 6 fathoms (11m0), mud, about 2 cables off the south-western side of the western island; two white masts in line, bearing 058°, lead towards this anchorage. There is also anchorage north-westward of this island, in a depth of 7 fathoms (12m8); this anchorage is defined by the intersection of two pairs of marks, surmounted by shapes, situated eastward and westward of the lighthouse, respectively.

A light is exhibited, at an elevation of 149 feet (45m4), from a white circular tower, 61 feet (18m6) in height, situated on the western extremity of the western island; *see* view facing this page.

Solitary rock, about 3¼ miles north-westward of the western Incog island, is 200 feet (61m0) high, and a reef extends about 2 cables eastward from it; there is a safe channel between this rock and the Incog islands.

Dangerous rock, about 7½ miles south-eastward of the largest Incog island, is 8 feet (2m4) high.

Strawstack (*Lat. 26° 56′ N., Long. 120° 41′ E.*), about 9 miles north-eastward of Dangerous rock, is a rocky islet about 300 feet (91m4) high; a smaller islet lies close north-westward of it.

A rock awash was reported by the s.s. *Waratah*, prior to 1863, to lie about 4½ miles westward of Strawstack, but its position is doubtful. In 1903, H.M.S. *Waterwitch* passed within half a mile of its assigned position, and, although a heavy easterly swell was running, no indications of the rock were seen.

Tai (Tae) islands consist of two islands and a number of rocks; the south-eastern island lies about 2½ miles north-north-eastward of Strawstack and has a table top summit about 400 feet (121m9) high. *See* view facing page 212. Mushroom rock, 260 feet (79m2) high, lies close off the north-east point of the northern Tai island; an islet, 103 feet (31m4) high, lies about one mile westward of the south point of this island. A reef awash, with a rock 30 feet (9m1) high on it, lies about one mile westward of the northern end of the

Charts 2412, 1262.

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Chart 1754.

northern island, and another reef awash lies about a mile farther westward. A reef awash lies about 4¼ miles north-westward of the same island.

Vessels passing between the Incog islands and the Tai islands should keep well towards the western side of this passage, as the ground in the vicinity of the latter group has not been surveyed.

Seven stars are a group of islets and rocks; the south-western and largest islet lies about 6¼ miles east-north-eastward of Mushroom rock, and is about 200 feet (61m0) high and is split in two. A rock awash lies about 3 cables westward of this islet. A rugged islet, 70 feet (21m3) high, lies about one mile north-eastward of the south-western islet, and about the same distance farther north-eastward are three low, flat rocks, the easternmost of which dries; there are other rocks around.

Cleft rock, 50 feet (15m2) high, lies about 3 miles north-north-westward of the south-western Seven star islet.

S.W. islet bearing 290°, 8 miles.

Seven stars.
(Original dated 1935).

Coast.—The coast between Angle island and Mortice bluff, about 13½ miles north-eastward, is indented by Ngasiang (Lishan) and Tchinkoen bays, but neither of them has been thoroughly examined. A rock, which dries 5 feet (1m5), lies about 4 cables southward of the southern entrance point of Ngasiang bay, and a rock awash is charted about 2 cables north-eastward of the same point.

Mortice bluff is an island almost connected to the mainland, as there is only a narrow boat channel on either side of an intervening islet.

Chart 1754, plan of Namkwan harbour.

Namkwan harbour.—Islets and dangers.—Namkwan harbour is entered between Fuhkien head, situated about 3 miles northward of Mortice bluff, and Namkwan point, about three-quarters of a mile farther northward. The harbour is surrounded by high hills and extends in a general north-westerly direction for about 13 miles north-westward of Fuhkien head, where it appears to expand into a wide basin, known as Gordon bay (chart 1754), which has not been surveyed. The harbour affords shelter in a typhoon.

Town point is situated on the northern side of the entrance and about 1¼ miles west-south-westward of Namkwan point, and there is a village at the head of Town bay, on its northern side. Bate islet lies close off Town point, and a rocky reef, which dries, extends about 2 cables north-westward from the islet. The fairway of the entrance channel is deep, but the depths are very irregular; in 1927, a depth of 5 fathoms (9m1) was reported about 5½ cables southward of Bate islet, and in 1908 a 7-fathom (12m8) patch was reported about 2 cables south-westward of that islet.

Tree islet is situated in the middle of the harbour and nearly 1¾ miles north-westward of Bate islet; the deep channel passes westward of this islet and westward of a rock, with a depth of 4½ fathoms (8m2), reported, in 1908, to exist about 7 cables north-

Charts 2412, 1262.

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Chart 1754, plan of Namkwan harbour.

westward of Bate islet; a mudbank extends from the eastern side of the harbour in this vicinity.

Kinsho (*Lat. 27° 14′ N., Long. 120° 23′ E.*) is an islet lying nearly 2½ miles northward of Tree islet; a rock, which dries, lies close off the south-western side of Kinsho, and a reef awash lies about 1½ cables off its eastern side. An island (chart 1754), almost connected to the northern shore, lies about 4¾ miles above Kinsho, and a rock awash, with a rock above water a cable north-westward, lies about 2 cables eastward of this island.

There is anchorage north-westward of Bate islet, in a depth of 14 fathoms (25m6); small vessels can anchor from 2 to 6 cables south-eastward of Tree islet, in depths of from 3½ to 5 fathoms (5m9 to 9m1), soft mud. In 1936 H.M.S. *Sandwich* anchored with Namkwan point bearing 020°, distant 5 cables; owing to the difficulty in weighing the anchor the following day, it was thought that the bottom was rock. There are many fishing nets off the entrance to the harbour, and the harbour itself is greatly obstructed by nets and bamboo moorings laid for sampans. Vessels should not attempt to proceed above Tree islet without local knowledge.

Chart 1754.

Namkwan bay.—Namkwan bay is entered between Namkwan point and Chinkwan island, which lies with its northern extremity about 2 miles eastward of this point. The depths shoal very abruptly at the entrance and the bay is very shallow. Namkwan, a walled town, is situated on the northern shore.

A reef extends about one cable from the southern extremity of Chinkwan island, and also nearly 1½ cables from the islet lying close off its south-west point. There is anchorage, in depths of from 7 to 9 fathoms (12m8 to 16m5), off the south-western side of Chinkwan island, northward of the second islet from its southern end.

Pikwan harbour.—Buoys.—Pikwan harbour lies between Chinkwan island and Pingfong island, situated about 1½ miles eastward, the mainland forming its northern side. The harbour affords good shelter in the north-east monsoon to vessels having local knowledge and with a draught of less than 15 feet (4m6); it is also available in a typhoon.

A shoal, with a depth of 3 fathoms (5m5), lies in the entrance to Pikwan harbour and about three-quarters of a mile south-westward of the south point of Pingfong island. A red conical buoy, privately maintained, is moored about half a mile eastward of the southern extremity of Chinkwan island. A sunken rock lies close off the south-west point of Pingfong island, and this point should be given a berth of a quarter of a mile.

A rock above water, with a sunken rock close westward of it, lies about one mile eastward of the south point of Pingfong island; an islet, with a sunken rock off its eastern end, lies close off the east point of Pingfong island. Vessels should pass eastward of these dangers. Pi pass, between the northern end of Pingfong island and the mainland, is obstructed by several rocks and islets.

Coast.—Dangers.—Kwan head is situated about 5½ miles north-eastward of Namkwan point; Toe point, about 3 miles farther north-eastward, is a narrow, salient point, the outer part being almost an island. Nob point is about 3¼ miles northward of Toe

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Chart 1754.

point. Pikwan peak, about 6 miles west-north-westward of Nob point, is a remarkable, sharp, conical hill.

Tanue bay, between Nob point and Tanue point, about 6 miles north-eastward, has general depths of less than 2 fathoms (3m7); Keun island lies in the middle of the entrance, and Gap islet, a low rock, lies about 1½ miles southward of Tanue point. A rock awash lies about a quarter of a mile southward of Tanue point, and some rocks above water lie about the same distance south-westward of this point.

Farmer rock, which dries, lies about 4 miles north-eastward of Tanue point.

Pingyang point (*Lat. 27° 28′ N., Long. 120° 40′ E.*) is situated about 6 miles northward of Tanue point; Kinvang head is about 11½ miles northward of Pingyang point, and the Ao kiang flows out between. The approach to the Ao kiang is marked by a black spherical buoy surmounted by a sphere, privately maintained, moored about 8½ miles east-south-eastward of Kinvang head. The Feiyiin kiang flows out between Kinvang head and Siau pi point, about 10½ miles north-north-eastward; the passage over the bar has a depth of 9 feet (2m7). The four Tsang islets lie off the mouth of the Shwin gan river, and the southern and largest islet is on the northern side of the passage over the bar.

Off-lying islands and dangers.—Light.—Castellated rock, about 18 miles eastward of Tanue point, appears as two islets. *See* view facing this page.

Namki, lying with its west point about 20 miles eastward of Pingyang point, is the largest of a group of islands, with several reefs around, especially on the south-western side, which should be avoided; *see* views facing pages 212, 213. Port Namki is situated on the south-eastern side of Namki, but a swell rolls in during the north-east monsoon and also with south-easterly winds. A bay on the northern side of the west point of this island affords anchorage, with smooth water, for vessels with local knowledge, and it is frequented by junks.

Turret islet lies about 4½ miles westward of the west point of Namki; reefs lie about a quarter of a mile northward and about three-quarters of a mile westward of this islet.

Piki shan lies with its south-west point about 11 miles north-eastward of the north point of Namki, and is the largest island of a group; *see* view facing page 213.

Chart 1763.

Pen chi yu is an islet lying about 1¾ miles northward of the western extremity of Piki shan, and about 4 cables farther northward is a smaller islet named Niu pi shan; Pei hsing, a rock which dries 18 feet (5m5), lies about 2 cables northward of Niu pi shan, and is the northernmost danger of the group. Hsi hsing, a rock which dries 10 feet (3m0), lies nearly 1¼ miles westward of Pen chi yu, and Tung hsing, which dries 18 feet (5m5), lies about 4 cables eastward of this islet.

Tung kua yu, situated about 9 miles northward of the north point of Namki, terminates westward in a noticeable bluff. Foul ground, on which are three small islets, extends fully half a mile westward and north-westward from the island; a rock above water, with a rock awash close southward of it, lies close off the south point of the island, and a rock, with a depth of 16 feet (4m9), lies about half a mile south-

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Strawstack, bearing 315°, distant about 5 miles.

Tai islands.

Two of the Seven Stars.

Tai islands from south-eastward.

(Original dated 1844).

Castellated rock, bearing 311°, distant about 7 miles.

Turret islet.

Namki.

View, in two parts, of Namki group.

(Original dated 1844).

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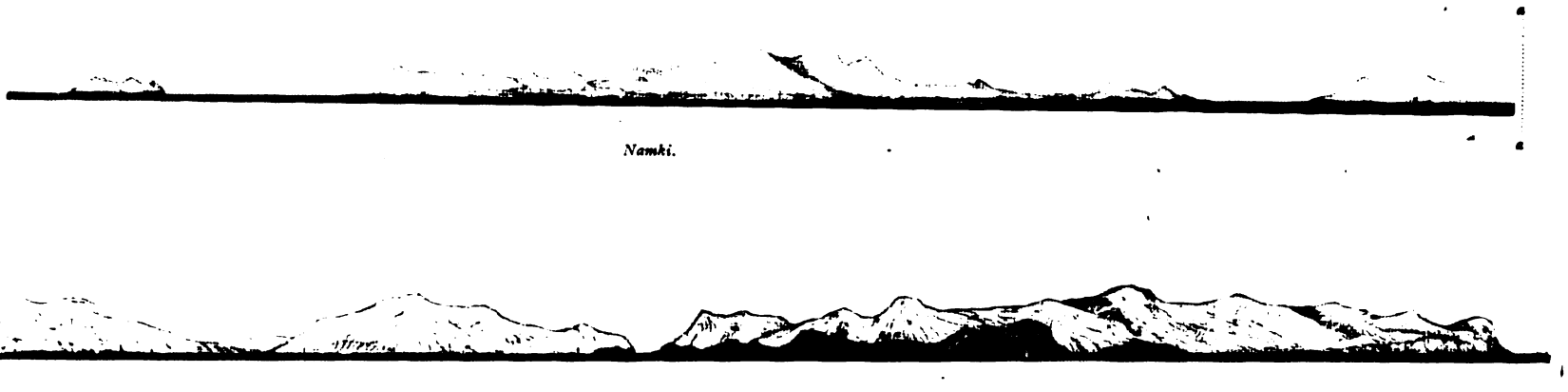

View, in two parts, of Namki and Piki shan.
(Original dated 1844).

Incog islands from westward.
(Original dated 1932).

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Chart 1763.

ward of this point. Nan chih, an islet 47 feet (14m3) high, with foul ground extending about 2 cables northward from it, lies about 2¼ miles north-north-westward of Tung kua yu.

A light is exhibited, at an elevation of 233 feet (71m2), from a white circular tower, 26 feet (7m9) in height, on the western extremity of Tung kua yu.

Pei lung shan, an island lying with its south point about 4¾ miles westward of Tung kua yu, is 645 feet (196m6) high; it is bordered by rocks in places, and Lung chu, an islet with rocks extending about one cable from its northern side, lies nearly 4 cables off its western side. Six more islets lie within a distance of 2 miles westward and south-westward of Lung chu. Anchorage can be obtained, by vessels with local knowledge, between these islets and the western side of Pei lung shan, in a depth of about 7 fathoms (12m8).

Li chi shan, the south-eastern of the Taepi islands, lies about 2½ miles west-north-westward of the north-west point of Pei lung shan; Tung pang shan, the north-western island of the group, lies nearly 2 miles north-westward of Li chi shan, and is 190 feet (57m9) high; Chang tai shan, 265 feet (80m8) high, lies about 4 cables south-eastward of Tung pang shan, with Shan chi yu, an islet 78 feet (23m8) high, between; Heng liang shan lies between Chang tai shan and Li chi shan, and has an islet close off its north-western side. Rocks, some of which dry, extend about 4 cables from the eastern side of Chang tai shan, and Chin chi yu, an islet 77 feet (23m5) high, lies about 6 cables north-north-eastward of the north-east point of this island. Small vessels can obtain sheltered anchorage in the north-east monsoon, with smooth water, on the south-western side of these islands, in depths of from 3½ to 4 fathoms (6m4 to 7m3).

ISLANDS OFF THE MOUTH OF THE OU KIANG.—Tse islands.—The south-eastern group of islands lying off the mouth of the Ou kiang (page 218), consists of four islands, the south-western and largest of which, named Nan Tse shan, lies about 8 miles north-north-eastward of Tung kua yu, and is 590 feet (179m8) high. Pei Tse shan, 500 feet (152m4) high, and Hsi Tse shan, the two northern islands, are connected at low water and are separated from Nan Tse shan and Tung Tse shan, the two southern islands, by Tung nan men, a narrow channel with depths of from 5½ to 10 fathoms (10m1 to 18m3) in the fairway; at the western end of this channel, however, the depths decrease rapidly to 3½ fathoms (6m4). Tung Tse shan is 565 feet (171m6) high, and foul ground, on which are several islets and rocks, extends nearly half a mile from its south-eastern side.

Islets and dangers between the Piki shan group and the Tse islands.—Fu ting lies about 4 miles southward of the south point of Nan Tse shan and is 7 feet (2m1) high. Kua kua yu, nearly one mile east-north-eastward of Fu ting (*Lat. 27° 41′ N., Long. 121° 07′ E.*), is divided into two parts, the northern and highest of which is 185 feet (56m4) high; foul ground extends nearly 2 cables southward from this islet. Kuei chiao, a reef which dries 2 feet (0m6) lies nearly 1¼ miles east-north-eastward of Kua kua yu. Nan pai yu is a low islet lying about 1¾ miles north-eastward of Kua kua yu, and Pei pai yu lies nearly half a mile eastward of Nan pai yu; Sheng chiao, a rock with a depth of 6 feet (1m8) over it, lies about half a mile north-eastward of Nan pai yu.

Charts 1754, 2412, 1262.

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Chart 1763.

Hsia wu chiao, a rock 11 feet (3m4) high, lies about 1½ miles northward of Pei pai yu. Fu tao, about 9 cables north-westward of Hsia wu chiao, is the middle islet of a group of three, with several rocks around; westward of this group are Mo tao and Ke tao, two islets close together and separated from the first group by a channel about a quarter of a mile wide, with depths of from 5 to 9 fathoms (9m1 to 16m5). The channel between Mo tao and the foul ground extending south-eastward from Tung Tse shan is about 3 cables wide, with depths of about 5 fathoms (9m1).

Hu fen chiao, about 1½ miles south-westward of Ke tao, is a reef which dries 12 feet (3m7). Hu yu lies about 6 cables westward of Hu fen chiao and is 28 feet (8m5) high. Wang tiao chiao, a reef awash, lies about one mile northward of Hu yu and about half a mile southward of the south point of Nan Tse shan; Niu chiao, with a depth of 2 fathoms (3m7) over it, lies nearly 1½ miles west-north-westward of Hu yu.

Hei niu wan.—Hei niu wan is bounded eastward by the Tse islands and Pan mien shan, an island about half a mile northward; northward by the western part of the south coast of Tung tou shan; and westward by a chain of three islands extending about 2½ miles southward from the west point of Tung tou shan. The harbour affords good anchorage in depths of from 3 to 7 fathoms (5m5 to 12m8), but it is open to southerly and south-westerly winds, which bring in a heavy swell; it affords shelter in a typhoon.

The harbour is entered from the southward between the Tse islands and Ta chu shan, the southernmost of the islands forming the western side of the harbour, but a depth of not more than 3½ fathoms (6m4) can be carried through the deepest parts of this channel. Ta chu shan is cliffy on its southern and south-eastern sides; a 17-foot (5m2) patch lies about half a mile south-eastward of its south-east point. A spit, with depths of less than 3 fathoms (5m5) extends about one mile westward from the western side of Pei Tse shan.

Tung pei men, the eastern passage into Hei niu wan, lies between the Tse islands and the southern side of Pan mien shan, and has depths of more than 20 fathoms (36m6) over a width of fully 4 cables; the deepest part of the harbour, with depths of over 5 fathoms (9m1), lies westward of this passage. A flat, which dries, extends from the north-western side of Pan mien shan, leaving only a narrow, shoal passage between it and the south coast of Tung tou shan.

Chung chu shan and Hsiao chu shan are the two islands northward of Ta chu shan and on the western side of Hei niu wan. There is a deep passage between Ta chu shan and Chung chu shan, and also between Hsiao chu shan and the western extremity of Tung tou shan; these passages cannot be approached from the westward, however, without crossing a bank with depths of less than 3 fathoms (5m5). Sheltered anchorage can be obtained north-westward of Hsiao chu shan, and also westward of Niu shih chiao, an islet of heaped up stones, 18 feet (5m5) high, lying close off the west point of Tung tou shan.

Tung tou shan is cliffy on its eastern side. There are several bays along its coasts, but they are mostly filled by flats which dry.

Hei niu wan is greatly obstructed by fishing stakes and nets.

Islands and dangers eastward of Tung tou shan.—Ta chih yu lies about 1½ miles eastward of the south-eastern extremity of

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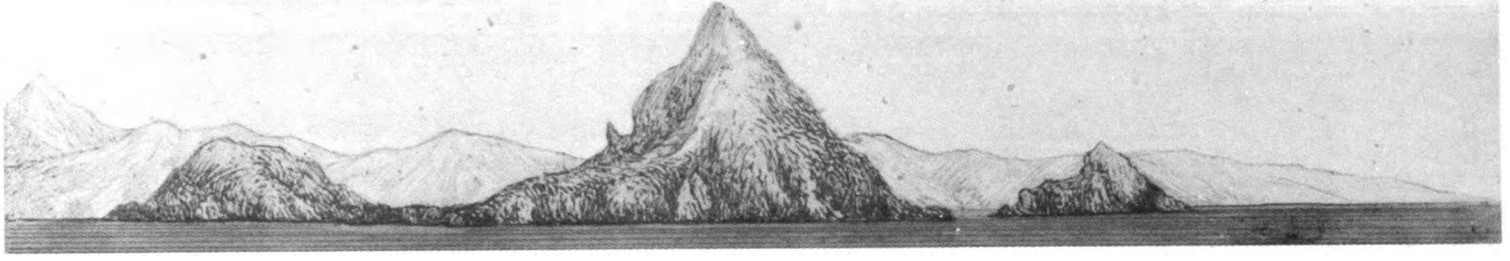
Hu tou yu, bearing 247°, *one mile.*



I yu shan.

Hu tou yu, bearing 287°, 3 *miles.*

Two views of Hu tou yu.

(Originals dated 1844).

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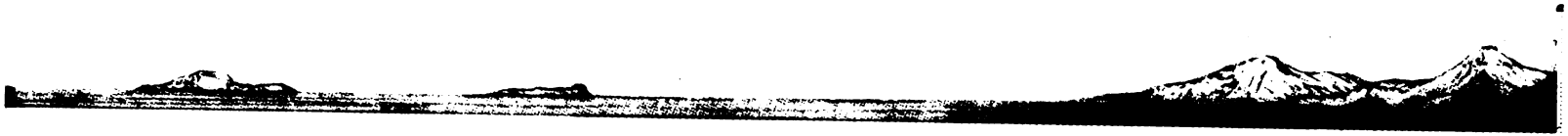
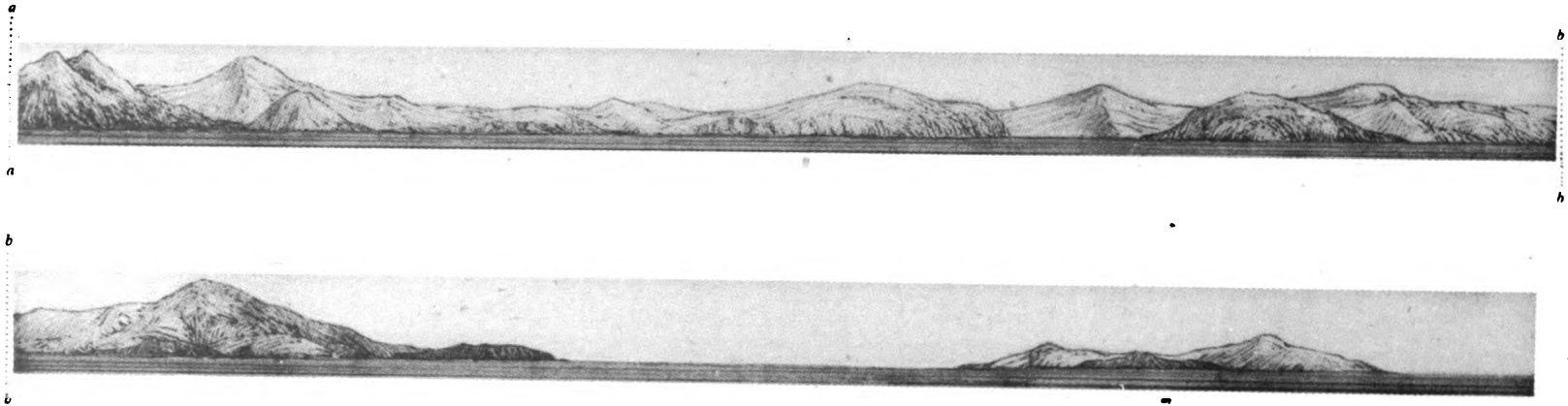


Hu tou yu, bearing 326° distant about 17 miles.



View, in three parts, of Hu tou yu and the islands and land northward.

(Original dated 1844).

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Chart 1763.

Tung tou shan, and is 230 feet (70^{m}1) high. Foul ground, on which are some islets, extends about half a mile southward from the south-west point of the island. Chih chiao, an islet 54 feet (16^{m}5) high, lies on a partly drying reef about 3 cables north-westward of the west point of Ta chih yu.

Several reefs lie within a distance of one mile off the northern half of the east coast of Tung tou shan; Ao chiao, the northernmost of these, with a depth of one fathom (1^{m}8) over it, lies about 1½ miles northward of Chih chiao and about 3½ cables eastward of the east point of Tung tou shan. Ching chiao lies about 4 cables south-eastward of the east point of Tung tou shan, and is awash.

Hu tou yu lies about 1½ miles east-north-eastward of the north point of Ta chih yu, and is 325 feet (99^{m}1) high. An islet lies close northward of the western extremity of Hu tou yu (*Lat. 27° 50′ N., Long. 121° 14′ E.*), and is connected to it by a reef; another islet lies about 1½ cables westward of this point. Yuan yu, about half a mile westward of the west point of Hu tou yu, is the southernmost of a group of islets and rocks lying together on a reef. *See* views facing pages 214, 215.

Tung tou strait.—Light.—Tung tou strait is bounded on the south-eastern side by Ta chu shan, Tung tou shan and Ta san pang shan, and north-westward by I yu shan and Chuan yuan ou shan. There are depths of from 2½ to 3 fathoms (4^{m}6 to 5^{m}5) in the south-western entrance of the strait, but farther in, about half a mile northward of the western extremity of Tung tou shan, there is a bar with a depth of only 11 feet (3^{m}3), within this bar the depths in the fairway increase gradually to 3 fathoms (5^{m}5) and more; the north-eastern entrance, between Ta san pang shan and Hua chien shan, is deep. Tung tou strait is only available for vessels of shallow draught, and local knowledge is necessary.

I yu shan lies with Mao tsui, its south-west point, about 3½ miles west-north-westward of the west point of Tung tou shan; Mao tsui has a hill on it, 125 feet (38^{m}1) high, and is the southern extremity of a peninsula joined to the main part of I yu shan by a low isthmus. The highest peak on the island is situated about 2 miles north-eastward of Mao tsui, and is 1,075 feet (327^{m}7) high.

Hsiao i yu, the middle and largest of a group of three islets, lies nearly one mile westward of Mao tsui and is 100 feet (30^{m}5) high. Lung hsu, a reef which dries 7 feet (2^{m}1), lies nearly 3 miles west-south-westward of Hsiao i yu, and about half a mile south-westward of Lung hsu is Lung mu chiao, which dries 18 feet (5^{m}5); both these dangers lie on the coastal bank which extends from the mainland southward of the mouth of the Ou kiang.

The south-western extremity of Chuan yuan ou shan lies about 7 cables eastward of the east point of I yu shan, the space between being almost entirely filled by a flat which dries, on which are two islets, leaving only a narrow channel, available for boats, on the Chuan yuan ou shan side. The south-western end of Chuan yuan ou shan is 300 feet (91^{m}4) high; thence the land rises to the summit of the island, 755 feet (230^{m}1) high, where there are two mounds close together, which are conspicuous when seen from the eastward or westward. Wen tzu tou is the outer end of a long, narrow tongue of land forming the north-eastern extremity of the island.

Charts 1754, 1759, 2412, 1262.

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Chart 1763.

Hua chien shan lies close off the south-east point of Chuan yuan ou shan, on the drying flat extending from the south coast of that island. The eastern side of Hua chien shan is a steep cliff, rising close within to the summit of the island, 315 feet (96m0) high, with a conspicuous mound on it. A rock above water lies close off the south-east point of the island, and a reef, with a depth of 2 fathoms (3m7), extends about 2 cables southward from this rock. A rock above water lies about one cable off the south-west point of Hua chien shan, and is connected to it by a reef; a rocky ledge, which dries 15 feet (4m6), lies about 3 cables west-south-westward of this point.

A light, privately maintained, is exhibited, at an elevation of 296 feet (90m2), from a white tower, 17 feet (5m2) in height, situated on the south-eastern side of Hua chien shan.

Ta san pang shan lies about half a mile south-eastward of Hua chien shan, and is separated from that island by San pang men, a deep passage with a navigable width of about 2 cables, which forms the north-eastern entrance to Tung tou strait. San chiao yu, an islet 64 feet (19m5) high, lies about 3 cables south-westward from the south-west point of Ta san pang shan, on the edge of the drying flat extending from the north coast of Tung tou shan; another islet, with a reef extending from its east and west points, lies about a cable northward of San chiao yu. There is a narrow boat channel between Ta san pang shan and Tung tou shan; a rocky islet, with a rock awash close off its eastern side, lies in the middle of this passage. During the south-west monsoon good anchorage can be obtained off the northern side of Ta san pang shan.

Wen chow yang.—Islands and dangers.—Wen chow yang is the name given to the area entered between Hu tou yu and Nan chiang, about 10 miles northward, and which extends as far as Tung tou shan and the islands lying north-north-westward of it across the mouths of the Ou kiang.

Tung yu, Mao tsao shan, and Chu hu tao are a group of three islets and numerous rocks; Tung yu (*Lat. 27° 56′ N., Long. 121° 13′ E.*), the south-eastern islet of the group, lies about 4¼ miles north-eastward of the north-eastern extremity of Ta san pang shan. Mao tsao shan, about 3½ cables north-westward of Tung yu, is 124 feet (37m8) high. Chu hu tao, the northern islet of the group, is almost two islets, joined together by reefs, and is about 73 feet (22m3) high.

The south-western extremity of Tung huan shan lies about 2½ miles north-westward of Mao tsao shan; the western part of the island is the highest, and rises to an elevation of 785 feet (239m3). Chang yu chiao, a rock 6 feet (1m8) high, lies close off the south-west point of the island; Tao kan tung is a long, narrow islet lying about 3½ cables south-eastward of the south point of the island, and the fairway of the channel between is deep. Pai lung yu, with several other islets or rocks, lies on the outer edge of a shoal extending about 3 cables southward and eastward from the eastern extremity of the island. Nan chiang lies nearly 1½ miles north-north-eastward of the east point of the island, and is 190 feet (57m9) high; Pei chiang lies close northward of the north-east point of Nan chiang, and is of about the same elevation. A rock, with a depth of 4 fathoms (7m3), lies about half a mile westward of the south point of Pei chiang.

Charts 1754, 1759, 2412, 1262.

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Chart 1763.

There is a clear channel between Tung huan shan and Chu hu tao, but a bank, with general depths of from 4 to 5 fathoms (7m3 to 9m1), extends nearly 1½ miles southward from the eastern part of Tung huan shan. The passage between Tung huan shan and Heng chih shan, an island about 2 miles north-westward, is shoal, with depths of less than 3 fathoms (5m5) over the greater part. Huang ta strait, between the western side of Tung huan shan and the eastern side of Ta men shan, about 1½ miles westward, is deep and clear.

Pi chia chiao lies about three-quarters of a mile north-eastward of Wen tzu tou (page 215), the north-east point of Chuan yuan ou shan, and is a remarkable, steep, jagged, dark brown islet 135 feet (41m1) high at its north-eastern end; at a distance the rock appears to be split in the middle, but such is not the case, as the higher portions are connected. Hsia ma chiao, about 4 cables south-westward of Pi chia chiao, is a brown, rocky islet 50 feet (15m2) high. There is a deep channel between these two islets, and also between Hsia ma chiao and Wen tzu tou.

Islands off the northern mouth of Ou kiang.—Chung shan lies nearly 2½ miles westward of Pi chia chiao and is remarkable in appearance; the land rises gradually from the various points on the northern, western, and eastern sides in long spurs till nearly half-way up, then it rises abruptly to the summit, the sides being rocky; on the southern side the ascent is more gradual, and there are two shoulders of lesser elevation.

Hsiao chung shan lies about a quarter of a mile off the east coast of Chung shan and is 145 feet (44m2) high; the passage between is shoal. A rocky ledge extends about one cable from the east point of Hsiao chung shan. Chi kuan chiao lies about 3 cables south-eastward of the south-east point of Chung shan and is a rugged islet 43 feet (13m1) high; rocks above water and sunken rocks extend about one cable northward and south-westward from it.

Chung shan spit, which dries in places, extends about 3½ miles westward from Chung shan.

Fairly sheltered anchorage can be obtained south-westward of Chung shan, in depths of from 4 to 7 fathoms (7m3 to 12m8), but there are numerous fishing states in this locality.

Ta men shan lies with its southern extremity (*Lat. 27° 56′ N., Long. 121° 05′ E.*) about 1¾ miles north-westward of the north-east point of Chung shan. It is mountainous, a steep ridge running from east to west through its north-western part; the highest peaks of this ridge are Ta men shan, 1,215 feet (370m3) high, situated nearly 1½ miles north-eastward of Huang ta tsui, the south-west point of the island, and Huang ta ou shan, 1,280 feet (390m1) high, situated about one mile south-westward of the north-east point of the island. A peak, with a boulder on its summit, lies about half a mile southward of Huang ta ou shan and is conspicuous, rising abruptly to an elevation of 1,140 feet (347m5). The south coast of the island is described with North passage on page 218.

Hsiao men shan lies off the north-west coast of Ta men shan, and is separated from it by Ta men, a passage about 3 cables wide in its narrowest part, with depths of over 3 fathoms (5m5) except at the western end, where there is a flat with depths of only a few feet.

Ta wu hsing and Hsiao wu hsing are two islets lying off the north-

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Chart 1763.

west coast of Hsiao men shan and separated from it by Hsiao men, a passage about a quarter of a mile wide.

OU KIANG.—The Ou kiang flows out southward of Chi tou, a point on the mainland about 4¾ miles north-westward of Huang ta tsui, the south-west point of Ta men shan; it has a general westerly direction as far as Yung chia cheng, a walled city situated on the southern bank about 20 miles above Chi tou; from Yung chia cheng to Chuchow, a distance of about 60 miles, it has a general west-north-westerly direction.

It is not safe to proceed above the anchorage eastward of Ching ling yu (*see* below), off the south coast of Ta men shan, without a pilot, as the river changes with extraordinary rapidity, at times even from day to day. In 1937 the least depth in the channel of the river as far as Yung chia cheng was 5 feet (1^{m}5).

Fishing stakes abound between Chi tou and Ta men shan, but there are comparatively few in the river itself.

Pilots.—There are no certificated pilots for the Ou kiang, but local pilots of the China Maritime Customs are available. Notice should be given by telegram as early as possible to the Commissioner of Customs at Yung chia cheng, stating the time that the pilot is required; it should also be stated whether the pilot is required at Ching ling yu or Lo shan (page 219).

Entrance channels.—There are three channels giving access to the mouth of the Ou kiang namely, South passage, between Chuan yuan ou shan and Chung shan; North passage, along the south coast of Ta men shan; and Ta men, between Ta men shan and Hsiao men shan. North passage is the only one available for shipping; the other two are used by junks.

The south coast of Ta men shan between Tung tou, its eastern extremity, and a point about 3 miles westward, is bold and cliffy; about midway between these two points there are some black jagged rocks under the cliffs, with some rocks, which dry 10 feet (3^{m}0), lying near the coast close eastward of them. About half a mile westward of Tung tou is a small bay which affords shelter to junks and boats in the north-east monsoon, but a heavy swell sets in; a rock close off the western shore of the bay dries 12 feet (3^{m}7). A small bay immediately north-eastward of the southern extremity of Ta men shan affords shelter for boats under some rocks close off its eastern entrance point; a rock which dries lies close off the southern extremity of Ta men shan.

Between the southern extremity of Ta men shan and Huang ta tsui, about 2½ miles westward, is a bay entirely occupied by a flat which dries. Ching ling yu, about 6 cables westward of the southern extremity of Ta men shan, rises to a sharp peak 147 feet (44^{m}8) high; some smaller rocks lie off its southern side. *See* view facing page 219. There is well sheltered anchorage eastward of this rock, in a depth of 6 fathoms (11^{m}0), good holding ground of stiff mud. A rock awash lies about 1½ cables south-westward of Huang ta tsui.

Chuang tai yu lies about three-quarters of a mile north-westward of Huang ta tsui, on the drying flat which extends about a quarter of a mile from the west coast of Ta men shan.

Tao tzu sha (Hutau bank), forming the southern side of North

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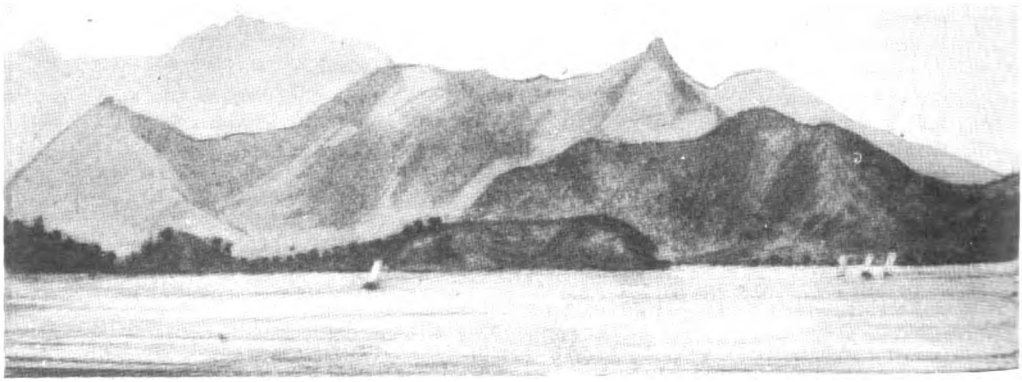
Ching ling yu, bearing 083°.

Ou kiang: North passage.

(Original dated 1878).



1,547-*foot peak, bearing* 238°, *Lung wan tou.*

Ou kiang.

(Original dated 1878).

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Chart 1763.

passage, is a long, narrow shoal, which dries in patches, running nearly parallel to the western half of the south coast of Ta men shan, at a distance of from a half to one mile.

San chiao sha (North bank) lies on the northern side of the channel and between Huang ta tsui and Chi tou, and dries. These banks are continually shifting. A conical stone beacon, with a flat top, stands on San chiao sha and nearly 1¾ miles eastward of Chi tou.

Chi tou to Yung chia cheng.—Buoys and beacons.—The entrance to the Ou kiang is divided into two parts by the extensive, drying Wen chow flats, which extend practically from the south-western end of I yu shan north-westward to Wen chow tao, a low, cultivated island; Shuang kun shan, the western extremity of this island, lies nearly 6½ miles westward of Chi tou. The channel southward of Wen chow flats has silted up, so only that northward of these flats is available for shipping. The channel of the river, and also the banks, are continually changing.

An isolated range of hills runs along the northern side of the entrance for a distance of about 2½ miles westward of Chi tou; Chi tou shan, the highest part of this ridge, lies about 6 cables west-south-westward of Chi tou and is 415 feet (126m5) high. Huang hua tsun is a village at the western end of the range. The channel runs along the northern shore of the river between this village and Lo shan, about 5 miles westward; this shore is fronted by a sea wall, the land within being low, flat, and cultivated, with numerous villages. Ho yu shan, about 2½ miles north-westward of Chi tou, is a smooth round-topped, isolated range 600 feet (182m9) high; close westward is Shan hou kang, a range of reddish hills. Hsiao chiang shan, about 2 miles north-eastward of Lo shan, has several trees on its summit; Ta chiang shan, about half a mile northward of Hsia chiang shan, is of dark appearance and also has some trees on its summit. Lo shan is a small, rocky eminence, with some trees on it; about 2 cables eastward of it is another small eminence. Just within these two points is Pang shih wei, a walled town.

Wen chow tao or Ling kun, on the opposite side of the river, is surrounded by a sea wall. Shuang kun shan is 96 feet (29m3) high, and about a cable westward of it is a rock of about the same elevation; Tan kun shan, nearly 7 cables eastward of Shuang kun shan, is a round-topped mound on the north coast of Wen chow tao, 142 feet (43m3) high, with several red sand patches showing through the grass. These eminences are conspicuous from the river entrance.

Lung wan tou (Salamis point) is situated on the southern side of the river and about 2½ miles westward of Shuang kun shan; between Lung wan tou and Yen shan tsui (Jar point), nearly 1¼ miles westward, the land is low, cultivated, and faced by a sea wall. A range of hills rises to a summit of 970 feet (295m7) high, named Huang shih shan, nearly 2 miles south-eastward of Lung wan tou. Southward and south-westward of Yen shan tsui the land is mountainous; there is a conspicuous sharp peak, 1,547 feet (471m5) high, about 3 miles south-westward of this point. *See* view facing this page.

Above Lung wan tou (*Lat. 27° 58′ N., Long. 120° 48′ E.*) the channel runs along the southern side of the river, as a shoal extends from the northern bank for a distance of nearly 6 miles above Lo shan. On this shoal are Jen chow chien tu and Chi tu tu, both of

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Chart 1763.

which are flat, low, cultivated and inhabited; they are surrounded by sea walls. The south bank of the river above Yen shan tsui is low, flat and cultivated, with numerous houses, and generally fronted by a sea wall; the cultivated land extends from one to 3 miles inland, where it terminates on the slopes of the mountain ranges. The tanks of the Standard Oil Company are situated on the north bank of the river, about $1\frac{3}{4}$ miles north-westward of the north-west point of Chi tu tu.

The navigable channel of the river above Wen chow tao is marked by buoys and beacons, and these are altered as necessary to conform with the constant changes which take place in the bed of the river.

Wen chow port.—Light.—Wen chow port, off Yung chia cheng, affords berths for a limited number of vessels drawing from 15 to 20 feet (4^m6 to 6^m1). Kiang hsin szu is an islet lying about 2 cables off the city, on a flat which dries; Elephant rock, which dries about 10 feet (3^m0), lies about three-quarters of a cable southward of the east point of this islet. Foul ground, with a least depth of 3 feet (0^m9), extends about one cable north-eastward from the north-eastern side of Kiang hsin szu; about two-thirds of the width of the passage between the eastern end of this islet and the Custom house on the southern bank of the river is occupied by a sandbank which dries, whilst over the remaining part there is a depth of not more than about 4 feet (1^m2).

A light is exhibited, at an elevation of 15 feet (4^m6), from a red iron beacon with a white band, surmounted by a sphere, on Elephant rock.

There are four wharves with depths of from 12 to 18 feet (3^m7 to 5^m5) alongside. The best landing place for boats is at the China Merchants pontoon, where there is a depth of 3 feet (0^m9) alongside; landing can also be effected at a stone slip abreast the Custom House. The tidal streams are strong, and there is practically no slack water.

There is a regular air service with Shanghai and Canton; *see* page 4. Small quantities of fresh provisions can be obtained. There are several hospitals.

Shipping.—In 1935, 203 steam vessels with an aggregate of 96,640 tons entered the port; the largest vessel which entered during that year was of 1,742 tons, with a draught of 15 feet (4^m6).

Regulations.—The following are extracts from the Harbour regulations for Wen chow port:—

Vessels entering the harbour will be boarded by a Berthing officer, who will direct them to proper berths.

Vessels shall moor in accordance with instructions from the Harbour master, and shall not shift berth without special permission, except when outward bound after having obtained their clearance papers.

Applications for berths or for permission to shift must be made at the Harbour master's office by the master, the first officer, or the pilot in charge, when the necessary instructions concerning the berth will be given. If a vessel be instructed by the Harbour master to shift her berth, she shall do so.

Vessels having any infectious disease on board, or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died, of an infectious disease, shall, on approaching the port, hoist the quarantine flag, anchor in the quarantine anchorage, and keep that flag flying until pratique has been granted.

Charts 1754, 1759, 2412, 1262.

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Chart 1763.

No person shall be permitted to leave or board such a vessel without a permit from the Harbour master or Port Health officer.

Vessels are forbidden to proceed at such a speed through the harbour as renders their wash dangerous to properly laden cargo boats and sampans.

The blowing of steam whistles or sirens, except for the purpose of signalling in accordance with the "Regulations for Preventing Collisions at Sea," or for the purpose of warning vessels of danger, is strictly forbidden.

Tidal streams.—The in-going tidal stream near Ching ling yu has a maximum rate of 2 knots, the out-going stream 2½ knots. After passing Ching ling yu the water changes from clear and salt to muddy and brackish. Off Huang ta tsui the stream changes from in-going to out-going gradually through north, and from out-going to in-going through south; slack water lasts but a few minutes.

The duration of the in-going stream off Chi tou (*Lat. 27° 59′ N., Long. 120° 57′ E.*) is 5½ hours, and its greatest rate is 3 knots; the duration of the out-going stream is 6 hours, and its greatest rate 4½ knots. The out-going stream through the channel southward of Wen chow tao may attain a rate of about 5 knots; the tidal streams here continue to run for about 25 minutes after the times of high and low water.

In Wen chow port the average duration of the flood tide is 4¾ hours, and that of the ebb 7½ hours; the tidal streams continue for 38 minutes after the times of high and low water. During freshets, which occur in April, May, and June after heavy rains, the out-going stream sometimes runs for a whole day at a rate of about 6 knots.

Yung chia cheng.—Yung chia cheng, formerly named Wen chow fu, was founded, and its walls built, in about 374 A.D., tradition asserting that the site was chosen on four hills because of a superstition connecting these with four stars in the constellation Ursæ Majoris. In 1935 the population was 120,000.

The transport of goods is mainly carried out by water. Craft of about 20 tons can ascend the main river for about 30 miles above the city, when the rapids commence and the tidal influence ends; smaller craft can ascend a further 60 miles to Chuchow.

Health.—The diseases of Yung chia cheng are cholera, ague, ophthalmia, and small-pox; elephantiasis exists, but leprosy is very rare. These diseases are confined to the native population, and the city may be considered generally healthy for a Chinese town. The most healthy time of the year is from December to February, inclusive, and the most unhealthy, June and July.

Charts 1763, 1759.

COAST.—Lo ching wan.—Lo ching wan (Lot sin bay), northward of Hsiao men shan (page 217) is bounded westward by the main coast northward of Chi tou, and eastward by Yu huan tao (Ta u island); the latter is situated with Kan lu tsui, its south-western point, about 3½ miles northward of the western extremity of Tung huan shan. The bay is free from dangers in the southern part, but a large portion of the northern part is shoal, and there are several islets here. Good anchorage can be obtained in the southern part, off the west coast of Yu huan tao, where there are general

Charts 1754, 2412, 1262.

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Charts 1763, 1759.

depths of from 5 to 8 fathoms (9m1 to 14m6); it is available in a typhoon.

The western entrance point of the bay is situated about 4 miles north-north-eastward of Chi tou, and is hilly, rising to an elevation of 490 feet (149m3) about three-quarters of a mile within. The western shore between this point and a point about 9 miles north-north-eastward is fronted by a coastal bank which dries out as much as 2¾ miles in places. Northward of a line joining the latter point and Lien yu, an islet lying close of the north-western extremity of Yu huan tao, is Lo ching ou, an estuary encumbered with many islands and extensive sandbanks which extend from either shore; this estuary extends for over 12 miles in a northerly direction.

A rock awash lies nearly one cable off the western side of Kan lu tsui. Heng chih shan, an island 390 feet (118m9) high, lies about three-quarters of a mile southward of Kan lu tsui; a shoal, with depths of less than 3 fathoms (5m5), extends about 3 cables from the north-western side of Heng chih shan, and Kan lu chiao, a detached rock with a depth of 1¼ fathoms (2m3), lies about 7 cables northward of the south-west point of this island. There is a deep and clear channel between Kan lu chiao and Kan lu tsui.

Chart 1759.

Yu huan tao and off-lying islands.—Lights.—The south coast of Yu huan tao between Kan lu tsui and a point about 4 miles eastward is cliffy and fairly steep-to; this point is the western entrance point to a bay almost entirely occupied by a flat which dries. Huang men shan, an island 425 feet (129m5) high, lies nearly half a mile off the eastern entrance point of this bay, with an islet, 198 feet (60m3) high and almost connected to the Yu huan tao coast by a reef, between. Wai huang men, the passage between this islet and Huang men shan, has a least depth of 8 fathoms (14m6) in the fairway, but it is narrowed to a width of about one cable by an islet lying close off the north-west point of the latter island.

Kan men wan (Kemong harbour) has its main entrance between Huang men shan and Nan pai shan, an island 339 feet (103m3) high lying about 1¼ miles north-eastward; it affords sheltered anchorage for small vessels, but the space is somewhat restricted, as the head of the bay is shoal. Huan niu chiao (Meier rock), which dries 3 feet (0m9), lies in the main entrance and about 4 cables off the western side of Nan pai shan; a reef, which dries 4 feet (1m2), with a rock awash close northward of it, lies about half a cable off the western side of Nan pai shan, and foul ground extends for about 2 cables southward from the western part of the south coast of this island, and also for about 1¼ cables from its east point. An islet lies close off the north-west point of Nan pai shan. Tung men, the passage between Nan pai shan and the coast between Kan men tou, the south-eastern extremity of Yu huan tao, and a point about 1¼ miles westward, is about 1¼ cables wide and has a least depth of 5 fathoms (9m1) in the fairway; on the northern side of this passage is a small islet named Kuan ti yu. A light, privately maintained, is exhibited, at an elevation of 163 feet (49m7), from a white masonry tower, 15 feet (4m6) in height, on Kan men tou.

Huan men wan is a shoal bay, lying between the east coast of Yu huan tao and the main coast north-westward of Hebe head, situated

Charts 2412, 1262.

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Chart 1759.

nearly 6 miles north-eastward of Kan men tou ; broad flats, which dry, extend from both shores of the bay, and an islet and some rocks lie on the eastern side. Huan men wan is connected with the northern part of Lo ching wan by a narrow passage leading along the northern side of Yu huan tao ; this passage is only available for small craft, and the narrowest part, where there is a sharp bend along Huan men tou, the north-east point of Yu huan tao, situated about 7¼ miles northward of Kan men tou, is even dangerous. A light, privately maintained, is exhibited, at an elevation of 69 feet (21m0), on the point on the mainland on the northern side of these narrows.

Huo cha shan (Chin ki), lies with its north-east point about 1¾ miles southward of Hebe head ; Yuan yu, an islet 120 feet (36m6) high, lies close northward of the western extremity of Huo cha shan and on the drying bank which extends from the north coast of that island. Tauan island lies about three-quarters of a mile north-eastward of Huo cha shan ; the passage between should not be attempted, as a sunken rock lies in the middle, and a reef extends north-eastward from Huo cha shan. There are several rocks and shoal water between Tauan island and Hebe head.

Taluk (*Lat. 28° 05′* N., *Long. 121° 24′ E.*), the highest island in this vicinity, lies about 2 miles southward of Tauan island, with an islet and some rocks between. There is anchorage for vessels with local knowledge, in depths of from 3 to 4 fathoms (5m5 to 7m3), between Huo cha shan and Taluk.

The northernmost of the three Seoluk islands lies about 1½ miles southward of Taluk, and vessels using the passage between should hold the Taluk side.

Pe shan lies about 4½ miles eastward of Taluk ; there are several rocks around this island, and two islets lie close together about half a mile southward of its south-east point. *See* view facing page 224. Fishing stakes, connected by strong ropes, extend from a position about 9 miles southward to a position about 9 miles eastward of Pe shan.

Flare islet, about one mile north-westward of Pe shan, is low and flat. Sugarloaf, an islet with an islet or rocks close northward of it, lies about 1¾ miles northward of Flare islet.

Coast.—Off-lying islands and dangers.—Ye van bay, between Hebe head and Sung men (Song men) point, about 13 miles north-eastward, is shoal, and there are some islets and rocks off its shores. Sung men point is the south-western extremity of Sung men shan, an island almost connected to the mainland by flats, through which is a narrow passage, named Penetration pass, used by native craft ; on the mainland opposite the northern end of the island is Sung men, a walled town.

A flat rock, with a sunken rock about 1½ cables north-eastward of it, lies about 2½ miles south-westward of Sung men point ; another flat rock, with a rock awash close off its south-eastern side, lies nearly 3 miles south-south-eastward of the same point.

San shi, with two reefs close off its western side, lies about 2½ miles south-eastward of Sung men point ; there are several rocks and reefs within a distance of one mile off the southern end of Sung men shan. An islet, with a reef off its north-eastern end, lies about 1½ miles south-eastward of San shi, and there is another islet between. An islet, with

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Chart 1759.

a reef off its southern side, lies about one mile northward of San shi. There is a navigable channel, about one mile wide, with a least depth of 4 fathoms (7m3), between these islets and the rocks lying off the southern end of Sung men shan, but it should not be used without local knowledge.

Soudan island (*Lat. 28° 16′ N., Long. 121° 44′ E.*), the easternmost island in this locality, lies about 5 miles east-north-eastward of San shi, and there is a reef close off its southern side. The Stragglers are a group of rocks lying about 1½ miles south-westward of Soudan island. *See* view facing page 225.

Shetung lies about midway between Soudan island and the east coast of Sung men shan; a reef lies about 3 cables off its southern side, and there are several rocky islets off its south-east points. Two islets lie between Shetung and the east coast of Sung men shan; a reef, with three rocks above water on it, extends about one mile north-eastward from the eastern of these two islets, leaving a channel, with a least depth of 3½ fathoms (5m9), between it and Shetung. The passage between the two islets is not navigable.

The coast northward of Sung men shan is fronted by a coastal bank, about 6 miles wide in places; this bank is fringed by a chain of islands and rocks. Crookback island, with numerous rocks around, lies about 4½ miles northward of Shetung, and is the southernmost of these islands; Lan chi shan (Tai chin), lying with its southern end about 13 miles northward of Shetung, is the largest of these islands. Several islets and dangers lie outside this chain. Chiku shan (Chikhok), the southernmost of these, lies nearly 6 miles north-north-eastward of Shetung, and rises in a cone to an elevation of 760 feet (231m6); there is a broad yellow stripe on its south-eastern side, and it is an excellent landmark. *See* views facing page 225. Low Chikhok, with a rock about 3 cables north-eastward of it, is an islet about one mile north-north-westward of Chiku shan. The channel between Chiku shan and Crookback island is narrowed to a width of about one mile by rocks extending from the latter. The s.s. *Store Nordiske*, with a draught of 16 feet (4m9), reported having struck an obstruction, probably a rock, in 1907, when three-quarters of a mile north-westward of Chiku shan. A rock awash lies nearly 3 miles north-north-westward of Low Chikhok, and nearly 4 miles farther in this direction is Li yu pei chiao, a rock which dries about 7 feet (2m1). Tung long (North Foreland), situated about 1½ miles eastward of the north-east point of Lan chi shan, is described with Tai chow wan on page 226.

Tai chow lieh tao.—Anchorage.—Shang yu (Hea chu), the southernmost of the Tai chow lieh tao (Tai chau islands), lies about 9½ miles eastward of Chiku shan and is 468 feet (142m6) high; it is cliffy except on its northern side; there is a conspicuous yellow streak on its south-eastern side, and close off its south point is a remarkable rocky islet, 169 feet (51m5) high (*see* view facing page 225) There are also other islets close off the south-eastern side and the eastern extremity of Shang yu. Hsia yu (Kisan), 339 feet (103m3) high, lies about one mile north-westward of Shang yu, and is cliffy except on its northern side; there are islets close off its south-eastern and north-eastern extremities. About midway between Hsia yu and Shang yu are three islets and a number of rocks; there is no passage between these three islets and Shang yu. Nu hsin chiao, a rock which

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To face page 224.

Pe shan

Shang yu, from the south-eastward, distant about 13 *miles.*

Tai chow lieh tao.

View, in three parts, of Pe shan, Shang yu, and Tai chow lieh tao.

(*Original dated 1844*).

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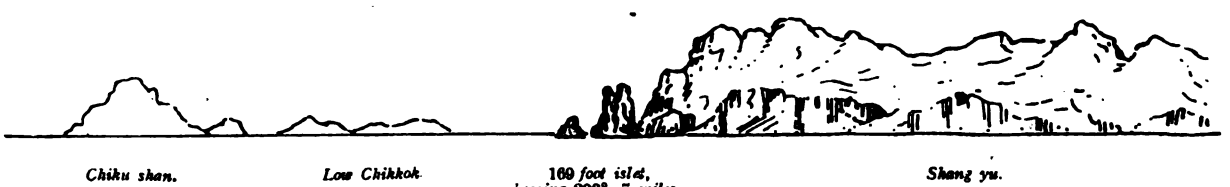
To face page 225

Sung men shan, with adjacent islands and rocks.

(Original dated 1935).



Tai-chow lieh tao: Shang yu and islets westward.

(Original dated 1935).

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Chart 1759.

dries 10 feet (3^{m}0), lies about one mile west-south-westward of Hsia yu, and about 6 cables south-westward of Nu hsin chiao is Lien tzu chiao, a rock or islet 14 feet (4^{m}3) high.

Hsia ta chen shan (Hea ta) lies with its south-west point about 1½ miles north-westward of Hsia yu; the highest part of the island, in about the middle, attains an elevation of 738 feet (224^{m}9). Chu yu, an islet 180 feet (54^{m}9) high, lies about half a mile westward of the south-western extremity of Hsia ta chen shan, and the passage between is dangerous, as rocks extend about 2 cables from the eastern side of Chu yu. Sun yu is a small islet connected to the south-western end of Chu yu by a reef; foul ground extends about half a mile southward from Chu yu, and on it is Ken yu and some rocks above water. A spit, with a rock on the outer end which dries 3 feet (0^{m}9), extends about a quarter of a mile north-north-eastward from the northern side of Chu yu; Yu wei chiao, a rock with a depth of 3 fathoms (5^{m}5), lies about 3½ cables northward of Chu yu. Ping feng shan, an islet 307 feet (93^{m}6) high, with some islets or rocks close off its northern end, lies close off the north-east point of Hsia ta chen shan; its northern and south-eastern ends are cliffy.

Shang ta chen shan (Shang ta), the next island northward of Hsia ta chen shan, is 669 feet (203^{m}9) high. Some islets lie within a distance of one mile from the south-western side of the island; a rock, with a depth of 2 fathoms (3^{m}7) over it, lies about 3 cables south-westward of Chu yao yu, the outer islet. A coastal bank, with depths of less than 3 fathoms (5^{m}5), extends as much as 1¼ miles from the western side of Shang ta chen shan between Chu yao yu and a peninsula about 1¼ miles northward; an islet and some above-water and sunken rocks lie within a quarter of a mile of the western extremity of this peninsula. The northern extremity of Shang ta chen shan is a small peninsula, 366 feet (111^{m}6) high, joined to the main part by a low, very narrow isthmus; foul ground, on which is Chi mei chiao, a reef which dries, extends about a quarter of a mile from the north-east point of this peninsula.

During the north-east monsoon there is good anchorage, for vessels with local knowledge, between Shang ta chen shan and Hsia ta chen shan, in depths of 11 fathoms (20^{m}1) and under; the holding ground is excellent, and shelter has been obtained here in a typhoon. This anchorage can be reached from either eastward or westward, but approaching from the latter direction there are depths of not more than 4¼ fathoms (7^{m}8) north-eastward of Chu yu (*Lat. 28° 26′ N., Long. 121° 51′ E.*); numerous fishing stakes are laid in both entrances to this channel, and large fishing stakes are laid from one to 6 miles eastward of the group. There are depths of less than 5 fathoms (9^{m}1), or about one fathom (1^{m}8) less than those charted, between Shang ta chen shan and the coast. This island, and also Hsia ta chen shan, are inhabited.

She shan (Shang rock), an islet 217 feet (66^{m}1) high, with two islets or rocks close off its south-eastern side, lies about 2 miles north-eastward of the northern extremity of Shang ta chen shan; the channel between them is deep.

Tai chow wan.—Light.—Tai chow wan (Tai chau bay) lies between Lan chi shan (page 224) and Pi su point, about 15 miles northward; the area southward of the mouth of the Chiao kiang

Charts 2412, 1262.

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Chart 1759.

(Tai chau river), which flows into the head of the bay is partly occupied by Tai chow flats, which extend to as much as 4 miles from the western shore of the bay and dry; flats which dry extend from the northern shore to a distance of nearly 6 miles southward of Pi su point. Between these flats there is a channel, with depths of from 4 to 9 feet (1m2 to 2m7), which leads to the Port of Hai men, situated at the entrance to the Chiao kiang.

Tung long (North Foreland), an islet 242 feet (73m8) high, with an islet or rock close off its northern side, lies about 1¼ miles eastward of the north-east point of Lan chi shan; Hsi long, another islet, lies about half a mile southward of Tung long, and there are some above-water rocks between. A rock, with a depth of 4 feet (1m2) over it, the position of which is doubtful, is charted about one mile north-westward of Tung long. San shan tou lies about 1¼ miles northward of the north-west point of Lan chi shan, and is the northernmost and largest of four islets lying off this point. Pai sha shan (Mud island), 247 feet (75m3) high, with other islets and rocks, lies on the flat which extends from the northern shore of the bay.

The town of Hai men, which contains a post office, connected to the general telegraph system, is situated on the southern bank of the Chiao kiang, just within the entrance. A bank, which partly dries, extends about 2 miles westward from a position about 3 cables northward of the western end of the town, leaving a channel, with depths of from 8 to 16 feet (2m4 to 4m9), on either side; north-eastward of the town there is a small area in the river with depths of from 3 to 4¼ fathoms (5m5 to 8m2).

Several piers extend from the shore fronting the town. A light, privately maintained, is exhibited from a white tower, 15 feet (4m6) in height, on the southern entrance point of the river.

Islands and dangers in the approach to Tai chow wan.—I kiang shan (Squall islands) are two islands so close together that they appear as one except on east-north-easterly and west-south-westerly bearings; the western extremity of the northern island lies about 8½ miles north-eastward of Tung long. The northern island is 423 feet (128m9) high, and some rocks lie within a distance of half a mile north-westward of its north-western side, and a rock awash lies nearly 2 cables northward of its north-east point; foul ground extends nearly 3 cables from the south-eastern side of the southern island. A group of rocks lies about 2¾ miles west-north-westward of the northern I kiang shan.

Pai chia shan (Crate island), about 2¼ miles eastward of the northern I kiang shan, is cliffy and 259 feet (78m9) high; an islet lies close off its western end, and a reef extends about 2 cables from its eastern end. *See* view facing this page.

Chu su lies with its south point about 5½ miles north-westward of Pai chia shan, and rises to a sharp cone, 670 feet (204m2) high, in the eastern part of the island; there is a beacon on the summit of the western part of the island. Three rocks above water lie nearly midway between Chu su and I kiang shan, and a sunken rock lies about 2 cables south-south-eastward of the southern of them. Fir cone (*Lat. 28° 40′ N., Long. 121° 50′ E.*) is a rocky islet about 2¾ miles south-eastward of the south point of Chu su. Good anchorage can be obtained, by vessels with local knowledge, between the south point of Chu su and

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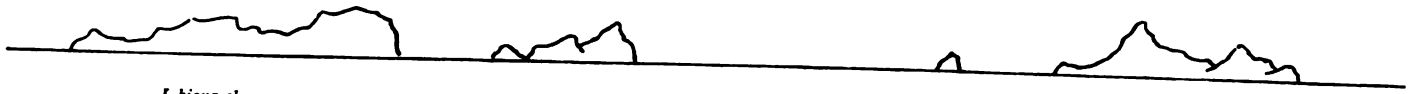

Islands in the approach to Tai chow wan.

(Original dated 1935).

Yu shan lieh tao from south-eastward.

(Original dated 1844).

Yu shan lieh tao from eastward.

(Original dated 1844).

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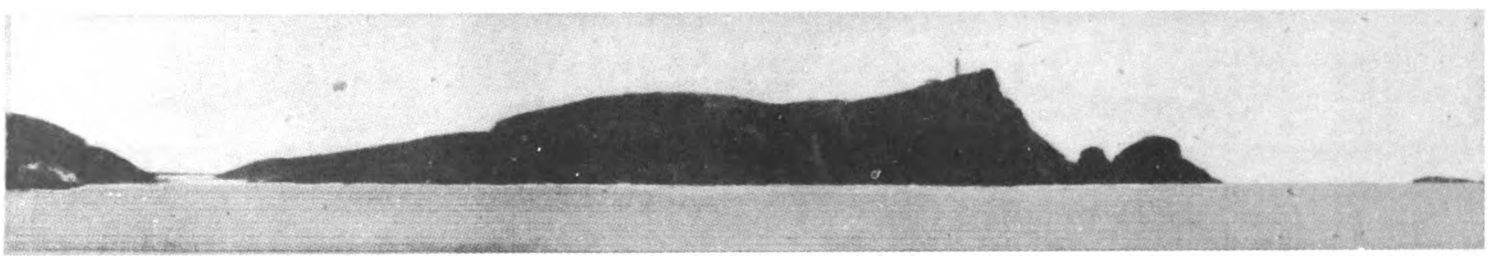
To face page 227.



Pei yu shan from southward.
(Original dated 1932).

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Chart 1759.

an islet, with a reef off its north-eastern side, lying about half a mile south-westward of this point. There are several islets and rocks north-westward of Chu su, but this area is of no importance to general navigation, as there are depths of less than 3 fathoms (5m5) between this island and the coast southward of Pi su point; a light, privately maintained, is exhibited, at an elevation of 150 feet (45m7), from a black iron framework tower, 32 feet (9m8) in height, with a white dwelling, on the summit of Mo pang, the north-western of these islets.

Tung chu lies with its south point nearly 5 miles eastward of the north point of Chu su, and is 700 feet (213m4) high; foul ground, with some rocks above water, extends about one mile southward from the south-west point of Tung chu. An islet, and a group of rocks, lie about midway between Chu su and Tung chu. Reef islet, with an islet or rock close northward of it, lies about 2½ miles south-south-westward of the south-west point of Tung chu; a reef extends about 4 cables eastward from Reef islet. Anchorage can be obtained in the north-east monsoon, by vessels with local knowledge, under the southern side of Tung chu, but there is generally a heavy swell.

Gau tau lies with its southern extremity about 2½ miles westward of the west point of Tung chu, and has four barren peaks on it; the north-eastern part of Gau tau is a separate island at high water. Some rocks above water lie within one mile of the southern extremity of Gau tau, and foul ground extends about three-quarters of a mile from its western side; a rock, which dries about 7 feet (2m1), lies about 3 cables northward of its north-east point.

Kin men lies northward of Gau tau, and between these two islands is Barren bay. Some rocks lie close off the salient points on the eastern side of Kin men, and a mud spit, with depths of from 4 to 5 fathoms (7m3 to 9m1), extends about 1¾ miles north-north-eastward from the north-west point of Gau tau. Nine Pin island is separated from the south-western extremity of Kin men by a deep but narrow channel, which terminates abruptly in the coastal bank, with depths of less than 3 fathoms (5m5), extending from the mainland. Nine Pin island is divided into two parts by a sandy isthmus, on which is a rock from which the island is named. Indifferent shelter may be obtained between Nine Pin island and Gau tau, by vessels with local knowledge, in depths of from 3 to 6 fathoms (5m5 to 11m0).

Pine Cone islet lies about 2½ miles north-north-westward of the south-western end of Nine Pin island; there are several rocks above water and sunken rocks in this locality, and the depths are probably less than those charted. Hsiao o kuan (Fall island) lies about 1¾ miles northward of Kin men, and is 247 feet (75m3) high; foul ground, with two small islets on it, extends about half a mile from its western end.

Yu shan lieh tao.—Light.—Yu shan lieh tao (Hieshan islands) consists of three inhabited islands and several rocky islets; Nan yu shan (Saddle island), the southern island, has a saddle-shaped summit, 411 feet (125m3) high, and lies nearly 20 miles eastward of Hsiao o kuan. Pei yu shan, about one mile north-eastward of Nan yu shan, is cliffy at its southern end. An islet, with a small islet off its southern side, lies close off the south-west point of Pei yu shan, and close westward of this islet is Pai chiao, an islet with a rock awash about 2 cables off its southern side; several islets or rocks lie within a distance of

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Chart 1759.

6 cables eastward of Pei yu shan. Niu ou chiao (Cheng rock) is an islet lying about half a mile north-eastward of the north point of Pei yu shan. Yu san chiao (Mushroom islet) lies about one mile northward of Niu ou chiao (*Lat. 28° 54′ N., Long. 122° 16′ E.*), and is so much undermined by the sea that it bears some resemblance to a large mushroom; a rock awash lies about a quarter of a mile northward of this islet, and nearly 2 miles north-eastward is a rock with a depth of 1¼ fathoms (2m3). *See* views facing page 226.

A light is exhibited, at an elevation of 345 feet (105m2), from a white circular tower, 55 feet (16m8) in height, on the summit of a remarkable cliff at the south-eastern end of Pei yu shan; *see* view facing page 227.

Coast.—Off-lying islands and dangers.—Yutin point is situated about 2½ miles northward of Pi su point (page 225), and some above-water and sunken rocks lie within a distance of one mile from it; Mount Bassett rises about 3 miles south-westward of the point. Between Yutin point and a point about 5 miles northward is the entrance to Po pa chiang, an inlet which extends about 8 miles in a westerly direction. A coastal bank, which dries, extends about 2 miles from the southern side of the entrance, and on it are the two islands Hsia ma shan and Chu men shan, almost connected to each other and to the coast about one mile north-north-westward of Yutin point. Chang hua wan shan, an island with several islets and rocks around, lies in the entrance to Po pa chiang and about 3 miles northward of Yutin point, leaving a channel on either side of it; in Pan tai men, the southern channel, which is about half a mile wide, there are depths of from 3 to 4 fathoms (5m5 to 7m3) in the fairway, and in Niu tou men, the northern channel, which is about 2 cables wide, there are depths of from 1½ to 4 fathoms (2m7 to 7m3); the depths seaward of these channels are, however, considerably less.

Nan chai, an islet 259 feet (78m9) high, lies about 4½ miles north-eastward of Yutin point; Pei chai, 236 feet (71m9) high, lies about one mile northward of Nan chai, and a chain of islets and rocks extends about one mile south-westward from it. Tien chuang shan, an islet 52 feet (15m8) high, lies about 2 miles westward of Nan chai, and there are two rocks, 29 feet (8m8) and 56 feet (17m1) high, respectively, close off the south-western side of Tien chuang shan. Niao yu, 139 feet (42m4) high, lies about three-quarters of a mile north-westward of Tien chuang shan. Ta chi shan, with several other islets and rocks around, lies nearly 2 miles north-north-eastward of Niao yu.

A bar extends from the coastal bank westward of Yutin point to Ta chi shan. The least depth over it in the approach to Pan tai men southward of Nan chai is 9 feet (2m7), that in the approach to Niu tou men is 5 feet (1m5), and the eastern end of the latter channel is encumbered by above water rocks and rocks which dry.

Chart 1759, with plan of Shih phu road and harbour.

San men wan.—Islets and dangers.—San men wan (San mun bay) is entered between Niu chiao men, a point about 7 miles northward of Yutin point, and Hsiao hsin chiao (Cape Conway), the south-east point of Niutow shan (Niu tiu island), situated about 14 miles north-eastward.

San men tao is a group of islets, with foul ground between them, the largest of which lies about 3¾ miles east-north-eastward of the

Charts 2412, 1262.

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Chart 1759, with plan of Shih phu road and harbour.

south-western entrance point of the bay and is 181 feet (55m2) high. A chain of islets and reefs extends nearly 3 miles north-westward from San men tao; Wu tzu tao is the north-western group of these islets, and the largest and highest of this group rises to an elevation of 276 feet (84m1). The channel westward of this chain of islets and reefs has depths of from 3¼ to 4 fathoms (5m9 to 7m3) in the fairway; Ping chiao (*Lat. 28° 59′ N., Long. 121° 44′ E.*), a rock 4 feet (1m2) high, surrounded by a reef, lies at the north-western end of this channel and about 2¾ miles northward of the south-western entrance point of the bay.

Nan shan (Lea ming), an island 506 feet (154m2) high, lies close off the south point of Niutow shan. Tsao hsieh pa yu (Sanchesan), an islet about 2½ miles south-westward of Nan shan, is divided into three parts, the northern being 84 feet (25m6) high. There are depths of from 4¼ to 6¾ fathoms (7m8 to 12m3) in the channel between Tsao hsieh pa yu and San men tao, and from 6 to 9 fathoms (11m0 to 16m5) between Tsao hsieh pa yu and Nan shan.

Nu ying chiao (Heroine rock) lies nearly 3 miles south-eastward of the north-east point of Nan shan, and dries 4 feet (1m2). Tsai hua chi (Twins) consists of two islets lying close together, with sunken rocks between; the western islets, situated about 1½ miles north-eastward of Nu ying chiao, is 100 feet (30m5) high, and the eastern and larger islet is 151 feet (46m0) high. Mi to tao (Medusa rock), about one mile northward of the western Tsai hua chi, is 139 feet (42m4) high.

Tafu island lies on the northern side of the bay, with its southern extremity about 5¼ miles westward of Nan shan; Ta fu tou (Albert peak), a remarkable peak shaped like a thumb, 1,004 feet (306m0) high, rises on the northern end of the island. *See* view facing page 230. Chia shan (Cone islet), 352 feet (107m3) high, lies about one mile south-westward of the southern extremity of Tafu island, and there are some rocks between; a reef, with two rocks above water on it, extends fully a quarter of a mile from the southern side of Chia shan, and a rocky islet lies about 3 cables east-south-eastward of it; a rock above water lies nearly three-quarters of a mile north-westward of Chia shan.

Chart 1759.

Yang chiao is an islet or rock lying about 4 miles westward of Chia shan. Man shan (St. George island) lies about 2½ miles north-north-eastward of Yang chiao and is 165 feet (50m3) high; this island lies off the entrance to a passage, with a depth of only a few feet in its southern part, which leads in a northerly direction to the head of Shih pu harbour (page 231). Hsia wan shan, situated with its southern extremity about 2 miles north-north-westward of Yang chiao, is the southernmost of a group of islands situated on a drying bank which extends about 2¾ miles north-westward; for 2 miles northward of the northern end of this group there is a chain of islets and rocks, the northernmost of which are on the edge of the coastal bank which extends from the northern shore of the bay. The passage westward of Hsia wan shan and the islands northward has irregular depths of from 5 to 20 fathoms (9m1 to 36m6) in the fairway; the passage eastward of these islands has many rocks in it, and is dangerous for navigation. A group of islands, of which Ta kou shan, situated about

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Chart 1759.

1¾ miles south-westward of Hsia wan shan, is the largest, lies on the coastal bank which extends from the western shore of the bay. Immediately southward of Ta kou shan is the entrance to a river, which leads to Chien tiao so cheng (Kien tiu), a town on the north bank about 2 miles within the entrance.

She pan shan (Quarry island) is situated on a mud flat and about 6½ miles north-westward of Hsia wan shan (*Lat. 29° 05′ N., Long. 121° 41′ E.*); there is a passage southward of this island, with a least depth of 3 fathoms (5m5) in the fairway, which leads to the entrances of the Hai yu kiang (Hae yu river) and the Chi men kiang (Ning hau river).

Shih pu harbour and approaches.—Tan tou shan (Tan tau san), an island divided into two parts by a low shingle isthmus, lies with its south-west point about 1¼ miles eastward of the north-east point of Niutow shan; the southern part of the island is 737 feet (224m6) high, and the northern part 536 feet (163m4) high. *See* view facing this page.

The approaches to Shih pu harbour from northward or southward are northward and southward, respectively, of Tan tou shan. Shih pu road lies in the southern approach.

Southern approach.—Islets and dangers.—A rocky spit extends nearly three-quarters of a mile south-south-eastward from Ta pi chiao (Nose islet), 138 feet (42m1) high, which lies close off the east coast of Niutow shan and about 2½ miles north-north-westward of Mi to tao. Feng tou chiao (Ellis islet) lies about 2½ miles east-north-eastward of Ta pi chiao and is 106 feet (32m3) high; there are depths of from 4½ to 5 fathoms (7m8 to 9m1) in the passage between these two islets. Ni lo chiao (Yi lu) lies about 1¾ miles north-north-eastward of Feng tou chiao, and from a short distance it appears as two islets; the northern part is 160 feet (48m8) high, and the southern part is 86 feet (26m2) high.

Shih pu road lies between the south-western end of Tan tou shan and the northern part of the eastern of Niutow shan; it affords indifferent anchorage, in depths of from 3½ to 5½ fathoms (6m4 to 10m1), mud, but the tidal streams may attain a rate of about 2½ knots, and there is usually a heavy swell.

Northern approach.—Islets and dangers.—Pan chao chiao, a rock which dries 14 feet (4m3), lies about 6 miles north-eastward of the north-east point of Tan tou shan; when covered this rock is not readily seen when the sea is smooth.

San yao shan (Cliff islets) consists of three islets and a number of rocks lying close together; the northernmost and highest islet lies about 4½ miles northward of the north point of Tan tou shan and is 153 feet (46m6) high. Hsing chiao, a rock which dries 2 feet (0m6), lies about one mile north-eastward of the northern San yao shan. So shan, an islet 142 feet (43m3) high, lies about three-quarters of a mile southward of the southern San yao shan.

Chart 1759, plan of Shih phu road and harbour.

Several islets lie off the east and north-east coasts of Tan tou shan. Niao chiao, the easternmost of these, lies about 1¾ miles north-eastward of the east point of this island; Lai tou yu, with foul ground around, which extends to a distance of half a mile from its eastern side, lies about half a mile westward of Niao chiao. Kaochiao is a group of

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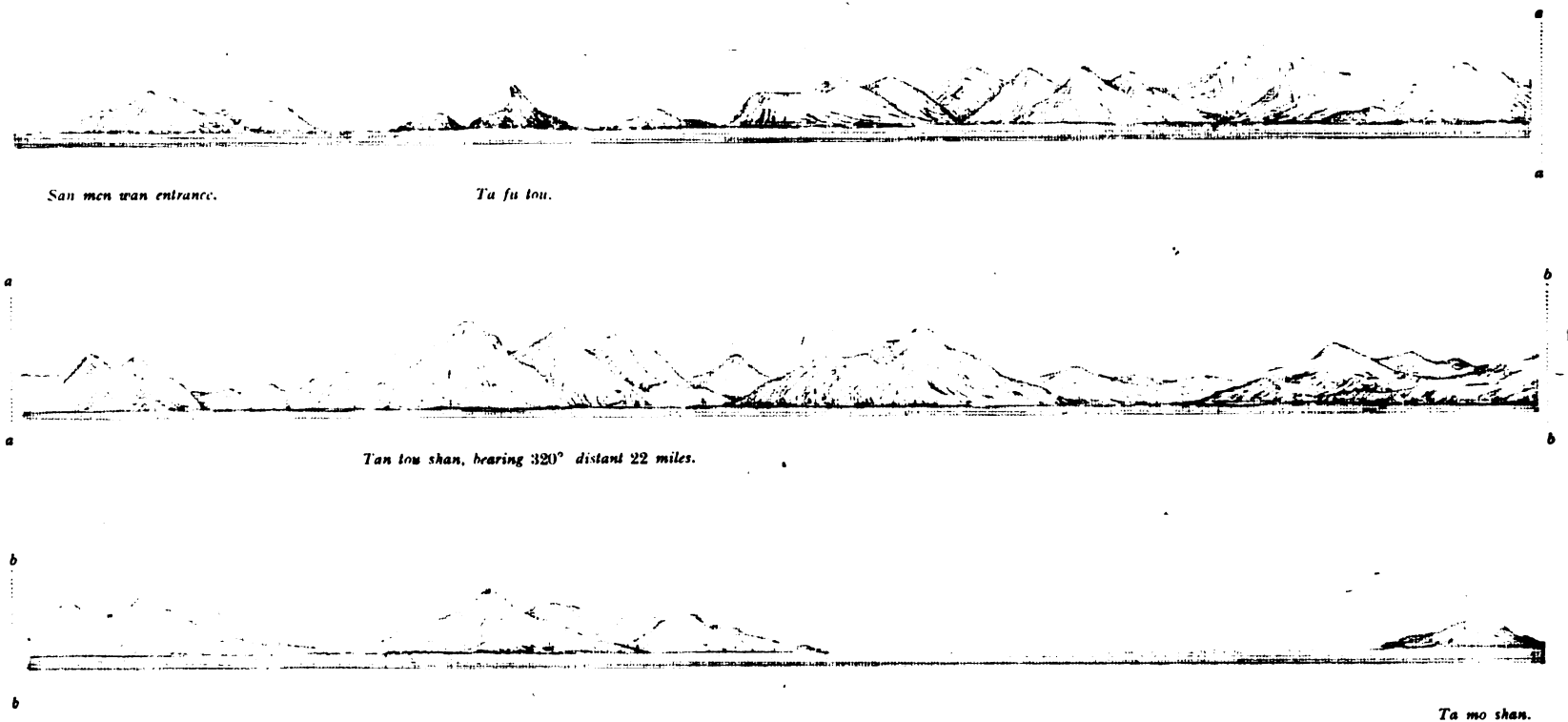
To face page 230.



View, in three parts, of the land around Shih pu road and harbour.

(Original dated 1844).

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Chart 1759, plan of Shih phu road and harbour.

three islets, almost connected to each other, lying within a distance of 6 cables north-eastward of the north-east point of Tan tou shan; the southern and highest of these three islets is 232 feet (70m7) high. Huo yu chiao, a reef which dries, lies close eastward of the middle islet. Chi lung chiao (*Lat. 29° 14′ N., Long. 122° 03′ E.*), an islet 124 feet (37m8) high, lies nearly one mile north-north-eastward of the north-east point of Tan tou shan.

Tung tou shan, an island 561 feet (171m0) high, lies about 1¾ miles north-westward of the north point of Tan tou shan and on the northern side of the northern approach to Shih pu harbour; foul ground, with two islets on it, extends about a quarter of a mile from the north-eastern side of Tung tou shan. Niu lan chi (Wang chi) 433 feet (132m0) high, lies close westward of Tung tou shan; Tung pan chiao (Bangao rock), a rock awash at high water, lies about a quarter of a mile southward of the east point of this island, and there is a least depth of 2¾ fathoms (5m0) in the channel between this rock and the north-western extremity of Tan tou shan. Lo po shan, 230 feet (70m1) high, lies close off the north-west point of Niu lan chi.

The northern part of the channel between Tan tou shan and an island which lies about 1¾ miles westward is encumbered with islets and rocks. Cheng chu chiao (Ching shu), the northernmost of these islets, lies about 2 miles south-westward of the north point of Tan tou shan, and consists of two islets joined together by a reef; there is a least depth of 2¼ fathoms (4m1) in the fairway of the passage westward of Cheng chu chiao, but there are two rocks awash in the passage eastward of these two islets.

Shih pu harbour.—Lights.—Shih pu harbour is bounded southward by Niutow shan and the islands westward of it, and northward by the mainland. The entrance, between the northern end of Niutow shan and the mainland, is obstructed by two islands, the northern of which is named Nan hui shan, leaving only a narrow channel northward and southward of them, respectively; the passage between these two islands is not navigable.

A light, privately maintained, is exhibited, at an elevation of 89 feet (27m1), from a white stone tower, 30 feet (9m1) in height, situated on the south-east point of Nan hui shan.

Hsia wan men, the channel between Niutow shan and the southern island, is only about one cable wide in its narrowest part, but is deep throughout the fairway; there is, however, a least depth of 3¼ fathoms (6m4) in the approach. The south-eastern entrance is obstructed by foul ground, with some islets on it, which extends nearly three-quarters of a mile north-eastward from the southern entrance point, leaving only a narrow passage, with a sharp bend in it, on the northern side; Ching lung chiao, the largest of these islets, is 93 feet (28m3) high. At the north-western end of Hsia wan men are the two islets Ta mao chu and Mao han shan; there is a deep channel between these two islets, and also between Ta mao chu, the western islet, and the northern extremity of Niutow shan. Huang pang chiao, a rock above water, lies about half a mile south-westward of the west point of Ta mao chu and about one cable off the north coast of Niutow shan.

Tung wa men, the northern entrance channel, is narrower and more tortuous than Hsia wan men, but it is always used by junks; the fairway is deep, but there is a least depth of 2¼ fathoms (4m1) in the

Charts 2412, 1262.

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Chart 1759, plan of Shih phu road and harbour.

approach. The entrance to Tung wa men, between the north-east point of Nan hui shan and the mainland, is only about half a cable wide, but has a least depth of 14 fathoms (4m3) in the fairway. Immediately within this entrance the channel widens out to a basin, which is, however, encumbered by islets and shoals, leaving a passage along the northern side of Nan hui shan about 1½ cables wide, with depths of from 7 to 21 fathoms (12m8 to 38m4); the village of Yentsangchienchen is situated on the western shore of the basin mentioned above. The channel turns sharply southward off the north-west point of Nan hui shan, and is from 1½ to 2 cables wide, with depths of over 5 fathoms (9m1), between the shoals which extend from either side; the town of Shih pu (*Lat. 29° 13′ N., Long. 121° 56′ E.*), is situated on the western side of this part of the channel.

Within the entrance Shih pu harbour runs south-westward for about 4 miles and then turns westward for a further 3 miles, and has several islands in it. Chung chieh shan, an island 351 feet (107m0) high, lies with its eastern extremity nearly 2¼ miles south-westward of Ta mao chu, and the bank on which it lies divides the deeper portions of the harbour, north-eastward and westward of this island, into two parts. Foul ground extends about half a mile north-north-eastward from the east point of Chung chieh shan. A least depth of 3½ fathoms (6m4) can be carried through the channel northward of Chung chieh shan; the south-western end of this channel deepens to as much as 25 fathoms (45m7). The channel southward of Chung chieh shan has a least depth of 2¾ fathoms (5m0) in the fairway; Lao shu shan, an islet 66 feet (20m1) high, lies on a bank in the middle of the entrance to this channel and about a quarter of a mile eastward of the east point of Chung chieh shan, with a deep passage between. The channel southward of Lao shu shan is obstructed by shoals.

On the southern side of the harbour, and about one mile south-westward of the western extremity of Chung chieh shan, is the entrance to Ling men, a narrow channel which runs along the western side of Niutow shan into San men wan; there are depths of 4 fathoms (7m3) and more in the northern end of this channel, but a depth of not more than 4 feet (1m2) can be carried through the southern approach to it.

About 3 miles above Chung chieh shan are two islands, with deep but narrow channels between them and also northward and southward of them; a light, privately maintained, is exhibited, at an elevation of 123 feet (37m5) from a white tower, with dwelling, situated on the western end of San men shan, the northern of these two islands. The head of the harbour has depths of over 5 fathoms (9m1) for about 1½ miles above San men shan, and then gradually shoals.

Chart 1759.

Coast.—About 1½ miles northward of the north point of Tung tou shan is the south-eastern extremity of a promontory rising to a elevation of 226 feet (68m9) just within this extremity. Yueh yu shan is an islet lying close off the north point of this promontory, and about 6 cables north-eastward of Yueh yu shan is Ping feng shan, an islet 290 feet (88m4) high. Between Yueh yu shan and a point about 2¼ miles north-westward is a bay entirely occupied by a drying mud flat, on which are some islets and rocks.

Charts 2412, 1262.

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Chart 1811.

NU PI SHAN CHANNEL.—Nu pi shan channel is the southern part of an inshore route which may be taken by vessels, not exceeding 20 feet (6^{m}1) in draught, proceeding up the coast; it also gives access to Nimrod sound (page 237). It is bounded westward by a number of islets and dangers lying off the main coast for about 20 miles northward of Yueh yu shan, and eastward by Chiu shan lieh tao (page 234) and the Mesan group (page 235).

This channel is useful during the winter, when northerly winds prevail and typhoons seldom occur. When a typhoon is passing in the offing, and a high easterly swell, its invariable precursor, is setting in upon the coast, vessels exceeding a draught of 16 feet (4^{m}9) should not use this channel, as the swell occasionally rises 8 feet (2^{m}4) above the mean level, and there is a depth of only 3¾ fathoms (6^{m}9) in places.

Western side of Nu pi shan channel.—Coast.—Light.—The coast on the western side of Nu pi shan channel is mountainous and rugged, with large, cultivated, thickly populated plains between the ranges; the bights in this stretch of coast are encumbered with mud flats, on which are numerous islands, islets and rocks, and there are few places where landing is convenient. There are depths of less than 3 fathoms (5^{m}5) for about 4 miles off the salient points. The sea in this locality is thickly discoloured by mud, and hidden dangers cannot be seen.

Tan men shan (Shang san), is a hilly island lying with its south point about 2½ miles northward of Yueh yu shan and about 6 cables offshore, with an islet and a rock above water between; two rocks, 37 feet (11^{m}3) and 20 feet (6^{m}1) high, lie about half a mile and three-quarters of a mile, respectively, north-north-eastward of the north east point of Tan men shan. Ta mu shan (Budei) lies nearly one mile eastward of Tan men shan and has a sharp summit; an islet lies close off its west point, and another islet, named Erh mu shan, lies close off its east point. An islet and some rocks lie within a distance of 8 cables northward and north-north-eastward of Erh mu shan.

Yang luan tai (Yangi) is an islet lying close off a point on the mainland nearly 4 miles northward of the north point of Tan men shan; a rock 71 feet (21^{m}6) high, with other rocks around, lies about 3 cables south-westward of Yang luan tai. Ta mo shan (Dai muk), about one mile eastward of Yang luan tai, is precipitous and of a dark colour. Three rocks lie within half a mile of its north-east point, the outer one being 17 feet (5^{m}2) high; about midway between Ta mo shan and Yang luan tai is a rock 93 feet (28^{m}3) high. *See* view facing page 230.

Mount Thornton (*Lat. 29° 27′ N., Long. 121° 57′ E.*) is situated about 3½ miles north-westward of Ta mo shan and about 1¼ miles inland. Jack ji, about one mile northward of Mount Thornton, is a walled town. Mor ore lies about half a mile off the coast eastward of Jack ji, and Ching ming is the largest of a chain of islets which extend about 2½ miles eastward from a point about 2 miles northward of Jack pi; the positions of these islets, and the rocks off-lying them, can best be seen on the chart.

Yang i is an island lying on the edge of the mud flat extending from the coast about 2 miles northward of Ching ming. For about 2½ miles northward of Yang i the coast is fringed by numerous islets and rocks, the positions of which can best be seen on the chart; an

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Chart 1811.

occasional light is exhibited, at an elevation of 56 feet (17m1), from a stone tower on an islet, 46 feet (14m0) high, lying about 2½ miles north-north-eastward of the north-east point of Yang i. Needle peak, nearly 4 miles westward of Yang i, is sharp and precipitous; *see* view on chart 1429.

Charts 1811, 1429.

Nu pi shan lies with its southern extremity about 3½ miles north-north-eastward of the north-east point of Yang i and about 1½ miles offshore. Its eastern side is precipitous; its western side has one deep indentation which nearly divides the island into two parts. The island is of a light colour, and is partially cultivated. Buffalo Nose, its north-east point, is perforated. A bank, with depths of less than 3 fathoms (5m5), extends about one mile south-eastward from the island; a rock, 38 feet (11m6) high, lies on the northern part of this bank and about 4 cables south-eastward of Buffalo Nose. A rock, 78 feet (23m8) high, lies about 1½ cables off the north-west point of the island, and a shoal, with a depth of 2 fathoms (3m7), extends about 2 cables from the western side of the rock.

Ploughman, nearly one mile westward of the north-west point of Nu pi shan, is rocky, precipitous, covered with grass, and has a flat summit; a bank, with depths of less than 3 fathoms (5m5), extends about one mile north-westward from Ploughman, and Lok yu and another islet lie on the western edge of this bank. A conspicuous rock, 6 feet (1m8) high, lies about half a mile eastward of the north point of Lok yu. Tunic island lies close off the main coast and nearly 1½ miles westward of Lok yu.

Caution.—In 1934, depths of fully one fathom (1m8) less than those charted were found in the northern part of Nu pi shan channel, between a position about 3 miles north-eastward of Nu pi shan and a position about the same distance north-westward of this island.

Chart 1811.

Eastern side of Nu pi shan channel.—Chiu shan lieh tao (Kue shan islands) are a group of islands, islets, and rocks lying on the eastern side of the southern entrance of Nu pi shan. Chi ku shan (Ki lung yu), about 11 miles eastward of Ta mo shan, is the south-eastern and most remarkable island of the group; it is precipitous on its southern and eastern sides, and has a well defined summit 538 feet (164m0) high. A rock lies close off its southern side, with a deep, narrow cleft between, in which is a sharp pinnacle about 15 feet (4m6) high; Chiang chun mao, a rock 105 feet (32m0) high, lies about a quarter of a mile off the eastern side of the island, and the passage between is foul. An islet, 57 feet (17m4) high, lies about a quarter of a mile north-westward of Chi ku shan. Ma pu shan (Twist islet) lies nearly 1½ miles westward of Chi ku shan; Hsia ma teng, 140 feet (42m7) high, lies about three-quarters of a mile north-eastward of Ma pu shan, and two other islets lie close together off the western side of Hsia ma teng. *See* views facing pages 234, 235.

Wen chung shan (Dai ching) lies about 1½ miles north-north-westward of Ma pu shan, and a rock, which dries 13 feet (4m0), lies about a quarter of a mile off its southern side; Pai chiao (Oliver rocks) are two rocks awash, the south-western of which lies about 6 cables southward of the south-west point of Wen chung shan. Hei chiao (Holderness rocks) are two rocky heads, close together, with

Charts 1759, 1199, 2412, 1262.

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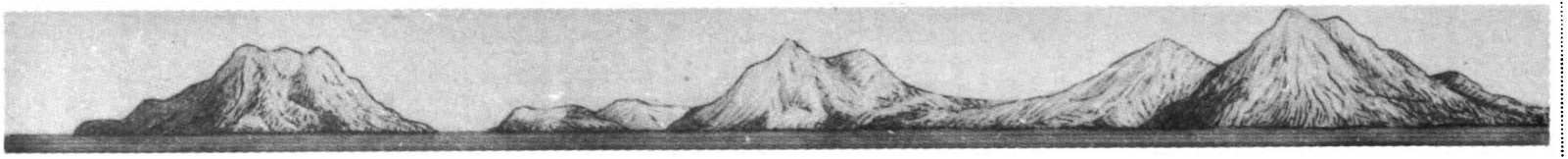

Chi ku shan, bearing 335° 15 *miles.*

View, in two parts, of Chiu shan lieh tao from the south-south-eastward.

(Original dated 1844).

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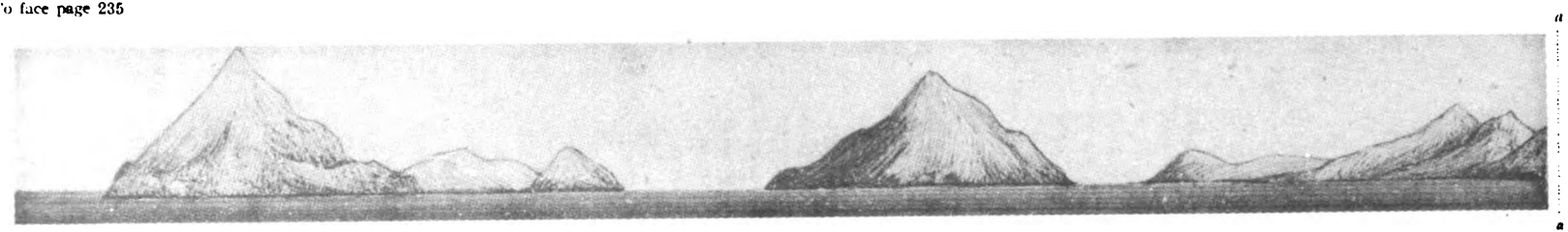
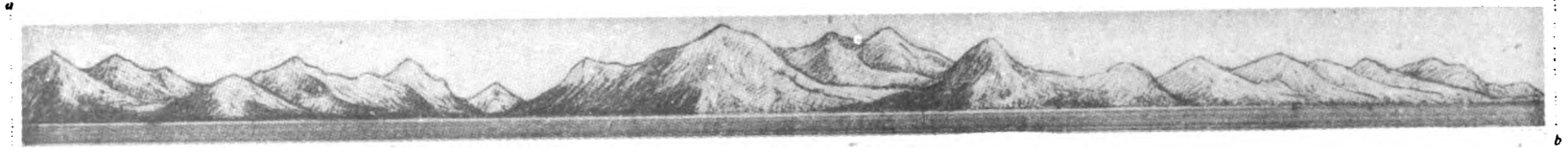


Chi ku shan, bearing 279°, 6 miles.



View, in three parts, of Chiu shan lieh-tao, from the eastward

Original dated 1844.

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Chart 1811.

a depth of less than 6 feet (1m8) over them, lying about 6 cables westward of Wen chung shan.

Nan chiu san (Dai wan), the largest island of the group, is separated from Wen chung shan by a narrow passage with a depth of 7 fathoms (12m8); its highest peak, in the western part of the island, is 542 feet (165m2) high. The principal village is situated near a narrow isthmus in the middle of the island. A bank, with a depth of less than 3 fathoms (5m5), extends fully one mile from the north-western side of the island.

Kun su wan, the north-western island of the group, lies about one mile north-westward of Nan chiu san, and is connected at low water to Observatory hill, an islet close off its south-eastern side. There is good anchorage for vessels with local knowledge, in a depth of 5 fathoms (9m1), mud, about 2 cables offshore, with Observatory hill bearing 077° and just open southward of the south point of Kun su wan, and the summit of this island bearing 357°; this anchorage is sheltered from winds between north-north-west and south, through north and east.

Chit kuk (*Lat. 29° 27′ N., Long. 122° 15′ E.*) lies about 3 miles eastward of Kun su wan, and is the south-eastern islet of a chain of islets and rocks extending in an easterly direction from that island. Chit kuk has a sharp summit, and is a useful landmark to vessels passing eastward of the group.

Shu shan, about 6 miles north-north-westward of Chit kuk, is a black rock 14 feet (4m3) high; a rock, which dries 8 feet (2m4), lies about 2 cables north-westward of Shu shan.

Charts 1811, 1429.

Mesan, the largest and highest island of this group, lies nearly 5 miles north-westward of Shu shan and is of a light colour, being covered with grass; it is precipitous on its eastern side and has a sharp summit. A ridge of rocks extends about a quarter of a mile from the southern side of the island, and a bank, with depths of less than 3 fathoms (5m5), extends fully half a mile from the north-western side of the island.

Tinker is a black, rugged islet lying about half a mile southward of the west point of Mesan; a pinnacle rock, with a depth of one foot (0m3), over which the sea seldom breaks, lies about half a mile east-south-eastward of Tinker. A bank, with a depth of 5 fathoms (9m1) over it, lies about 1½ miles south-eastward of Tinker. In 1933, fishing stakes were found to extend from the south-eastern islet of the Mesan group in a north-easterly direction to Mun dun san.

Lanyett lies about half a mile north-north-westward of Mesan, and another island lies about a quarter of a mile westward of Lanyett; a bank, with depths of less than 3 fathoms (5m5), extends nearly 1½ miles north-westward from these two islands, and there are several rocks above water on it.

Luhwang shan (Lu wang), one of the large islands of the Chusan archipelago (page 240), lies northward of, and is separated from, the Mesan group by a channel about one mile wide, with depths of from 6 to 14 fathoms (11m0 to 25m6) in the fairway. Castle rock, 52 feet (15m8) high, lies in the eastern part of this channel and about 1½ miles eastward of the north point of Lanyett; a rock, with a depth of 6 feet (1m8) over it, lies in the north-western part of the channel

Charts 1759, 1199, 2412, 1262.

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Charts 1811, 1429.

and about 2¼ miles north-westward of the north point of Lanyett. Mun dun san and the other islands off the south-eastern end of Luhwang shan are described on page 241.

A ridge of hills, covered with stunted gum trees and patches of cultivation, traverses the middle of Luhwang shan, and branches off at the north-western end to form three capes; Helby peaks, situated in about the middle of the north-western end, are the highest on the island. A hill at the south-eastern end of the island, 902 feet (274^{m}9) high, is conspicuous. *See* view on chart 1429. The plains are cultivated and irrigated.

The south-west coast of Luhwang shan is rugged and indented by several bays, which are, however, almost completely occupied by mud flats which dry. Flake island lies about one mile east-southward of Clarence point, the south-west point of Luhwang shan; a spit, with general depths of less than 3 fathoms (5^{m}5), extends about 3 miles south-eastward from Flake island, and near the outer end of this spit are the two Reef islands, which are connected to each other at low water. Heavy fishing stakes were reported, in 1934, to extend nearly 2 miles in a south-south-west direction from a position about three-quarters of a mile southward of Flake island; in 1937, numerous fishing stakes and floats were observed in mid-channel between the Reef islands and Nu pi shan.

Duffield rocks are a line of black rocks extending about 6 cables south-westward from Clarence point, and terminate in a rock which dries 4 feet (1^{m}2); the highest of these rocks is 53 feet (16^{m}2). The west coast of Luhwang shan, with the off-lying islands, is described with Duffield pass on page 260.

Chart 1811.

Dangers in Nu pi shan channel.—Pylades rock, nearly 3½ miles north-eastward of Ta mo shan and on the western side of the fairway through Nu pi shan channel, is awash; unless there is a heavy swell the sea only breaks on this rock at low water.

The Whelps consist of four rocky islets, in groups of two; the southernmost and highest islet lies nearly 3½ miles north-north-eastward of Pylades rock. These islets are on the western side of the fairway.

Corkers, on the western side of the fairway, consist of ten islets and some rocks, in three groups, with general depths of from 3½ to 4¾ fathoms (6^{m}4 to 8^{m}7) around and between. Hong yan zor, the south-western islet, lies about 3¼ miles north-westward of the northern Whelps and has precipitous sides; two rocks above water lie off its south-east point. The south-eastern islet, situated nearly 1¾ miles eastward of Hong yan zor, is 52 feet (15^{m}8) high, and a rock awash lies one cable eastward of it; a rock, with a depth of 6 feet (1^{m}8) over it, lies about 6 cables southward of the 52-foot (15^{m}8) high islet, and about 2 cables westward of this rock is another rock, with a depth of 5 feet (1^{m}5) over it. A rock awash at high water lies one cable eastward of the eastern islet of the northern group.

Starboard Jack, on the eastern side of the fairway and about 3¼ miles east-north-eastward of the south-eastern Corker, is a rugged black rock 30 feet (9^{m}1) high. A rock, which dries 6 feet (1^{m}8), lies 2 cables eastward of Starboard Jack, and a rock 2 feet (0^{m}6) high lies about one cable northward of it.

Charts 1759, 1199, 2412, 1262.

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Charts 1811, 1429.

Tidal streams.—The tidal streams in the vicinity of Chiu shan lieh tao are rotary, and, so far as the conformation of the islands will allow, run thus; the first half of the flood tide sets between south and west, and the last half between west and north; the first half of the ebb sets between north and east, and the last half between east and south. The maximum rate is from one to 3 knots, according to the age of the moon.

Between a position about 10 miles eastward of Chiu shan lieh tao and Tongting (chart 1199), about 30 miles north-eastward, the tidal streams are as follows; when the flood commences at Chiu shan lieh tao the tidal stream sets southward; it then changes through south-west to west; with the ebb at Chiu shan lieh tao the tidal stream first sets north-west, then changes through north and east to south. The rate is from a half to 2½ knots.

Chart 1429.

Anchorage.—Good anchorage can be obtained southward of Flake island (*Lat. 29° 42′ N., Long. 122° 04′ E.*) and westward of Reef islands, in depths of from 5 to 7 fathoms (9m1 to 12m8), sheltered from winds between north-west and east-south-east, through north and east. In fine weather there is good anchorage anywhere between Luhwang shan and Nimrod sound.

The tidal streams at the anchorage southward of Flake island set north-westward from 3½ hours before until 2½ hours after high water, and south-eastward from 2½ hours after high water until 3½ hours before the next high water. The rate is from one to 3 knots, according to the age of the moon.

Chart 1583.

NIMROD SOUND.—Nimrod sound or Hsiang shan bay is entered between Hunter point, situated about 2¼ miles westward of Tunic island (page 234), and Sail rock, about 4 miles north-westward. The sound extends for about 25 miles in a south-westerly direction from the entrance, and the inner half is encumbered with islands.

Entrance to Nimrod sound.—Islets and dangers.—The Chumung islets, with a number of rocks, lie off Hunter point; the easternmost islet, situated about one mile north-eastward of Hunter point, is the highest and most conspicuous of the group, and is of a light colour, precipitous on the eastern side, and has a well defined summit 195 feet (59m4) high, on which is a triangular framework beacon. Pearl rock, the northernmost rock in this vicinity, lies about 1½ miles northward of Hunter point and is 18 feet (5m5) high.

Anchorage can be obtained, in depths of from 3½ to 4½ fathoms (6m4 to 8m2), with Hunter point bearing 080°, distant from one to 2 miles.

Sail rock lies on the drying flat extending from the northern side of the entrance, and is a vertical, square rock 24 feet (7m3) high. The entrance to the Ta sung kiang lies about 1½ miles south-westward of Sail rock.

In 1934, fishing stakes were found to extend across the entrance to Nimrod sound, between the Chumung islets and the mouth of the Ta sung kiang.

Outer part of Nimrod sound.—Anchorage.—The outer half of Nimrod sound, for a distance of about 11 miles within the entrance, is almost entirely free from dangers, and is nowhere less than 1½ miles wide.

Charts 1199, 2412, 1262.

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Chart 1583.

Cone point is situated on the southern shore and about 4 miles west-south-westward of Hunter point. Cone rock (*Lat. 29° 38′ N., Long. 121° 50′ E.*), 18 feet (5^{m}5) high, lies about 6 cables northward of Cone point, and David islet lies about half a mile westward of this point. A rock, with a depth of one fathom (1^{m}8), lies about 2 cables north-north-eastward of David islet, and a rock, with a depth of 2½ fathoms (4^{m}1), lies about one mile westward of this islet. Nimrod point, about 1½ miles west-south-westward of David islet, has a hill on it 305 feet (93^{m}0) high. Dragon point is situated about 3¾ miles south-westward of Nimrod point, with Boat point, Rock point, and Fisherman point, between.

Barren point is situated on the northern side of Nimrod sound, about 6 miles south-westward of Sail rock, and Barren islet lies about half a mile north-eastward of the point. The two Nimrod islands lie close off the coast westward of Nimrod point; a bank, with depths of less than 3 fathoms (5^{m}5), extends from the coast within the line joining the northern Nimrod island and Barren point. Middle island lies in mid-channel and about one mile northward of Dragon point. Tasong point is situated about 1¾ miles west-north-westward of Dragon point.

Round point is situated about three-quarters of a mile southward of Dragon point, and the entrance to Medusa creek lies between this point and Medusa point, about 6 cables westward. This creek runs in an easterly direction for about 2 miles, and its channel is deep; it then opens out into a basin, which is, however mostly occupied by shoal flats. There is a landing place on the northern shore, about 1½ miles eastward of Round point. Anchorage can be obtained, in a depth of about 10 fathoms (18^{m}3), about 3 cables southward of the landing place.

Inner part of Nimrod sound.—Anchorages.—Parker island lies with its eastern extremity about one mile south-westward of Tasong point, and is separated from the northern shore of the sound by a narrow channel. A rock, which dries, lies about 4 cables eastward of the east point of the island, and a similar rock lies about 3½ cables south-eastward of the same point.. Entrance island lies about half a mile south-westward of Parker island; an islet lies about a quarter of a mile westward of Entrance island, and, in 1933, fishing stakes were found to extend across the channel up to a distance of nearly one mile southward of this islet. The channel southward of Parker and Entrance islands is deep; a 3-fathom (5^{m}5) patch lies about half a mile westward of Adam point, situated on the southern shore about 3 miles west-south-westward of Medusa point.

Pa za islands are a chain of six islands extending about 2¾ miles in a south-westerly direction from a position about 3 miles westward of Adam point. In 1934 H.M.S. *Bridgewater* anchored between Entrance island and Deepwater point, the north point of the north-eastern island of the Pa za group; this anchorage is entirely landlocked, and is recommended as affording good shelter in a typhoon. There is good anchorage for small vessels with local knowledge in the basin southward of the Pa za islands, in a depth of about 5 fathoms (9^{m}1), out of the strength of the tidal streams; between the east point of the north-eastern island and the southern shore of the sound there are depths of not more than 3 fathoms (5^{m}5).

Charts 1199, 2412, 1262.

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Chart 1583.

Morris island lies close off the northern shore of the sound and about 1½ miles north-north-eastward of Deepwater point; sheltered anchorage can be obtained about 4 cables east-south-eastward of this island, in a depth of 5 fathoms (9m1). Harlequin island lies with its south-east point about three-quarters of a mile north-westward of Deepwater point; a half-tide rock lies about 3 cables eastward of the south-east point of Harlequin island, and between this rock and Deepwater point there are depths of from 3½ to 10 fathoms (6m4 to 18m3). Eel islet lies about 1½ miles south-south-westward of the south point of Harlequin island, and there is anchorage, with good holding ground, northward of this islet, in depths of from 4½ to 6½ fathoms (8m2 to 11m9); a 2¾-fathom (5m0) patch lies about 6 cables north-eastward of Eel islet. Tung ju village, about half a mile westward of Harlequin island, is situated on the shore of a shoal bight. Hewett point is situated on the northern shore of the sound and about 2½ miles west-north-westward of Eel islet; Pisani shoal, with a depth of 1½ fathoms (2m7), lies nearly midway between this point and islet. Midway reef, which dries, lies about half a mile south-south-eastward of Hewett point.

The head of Nimrod sound, between Hewett point (*Lat. 29° 30′ N., Long. 121° 31′ E.*) and Bight point, about 3½ miles south-eastward is divided into two parts by a tongue of land, from which shoal flats extend in a north-easterly direction to Tung ja island, the south-western of the Pa za islands; there are several islets on these flats. Ninghai creek, on the eastern side of this tongue of land, has a narrow channel between the flats on either side. Su su ku bay, entered between Hewett point and Hastings point, about 1½ miles south-south-westward, is an extensive basin greatly occupied by flats.

Tidal streams in Nimrod sound.—The in-going tidal stream runs into the sound from a few minutes after low water until a few minutes after high water, and the out-going stream runs from a few minutes after high water until a few minutes after low water. At spring tides the maximum rate of the tidal streams at the entrance is 3 knots; at the anchorage northward of Eel islet the maximum rate is 4 knots, and the tidal streams are also strong in the channel southward of Parker island.

Charts 1199, 2412, 1262.

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CHAPTER VI.

CHUSAN ARCHIPELAGO AND SOUTHERN APPROACHES TO THE YANGTZE KIANG. YUNG RIVER AND HANGCHOW BAY.

Charts 1429, 1124.

CHUSAN ARCHIPELAGO.—The Chusan archipelago extends for about 35 miles northward of Luhwang shan (page 235), and includes that island. The islands are bold and rugged; the summits of the hills are often sharp and well defined, whilst their slopes are sterile and are covered with slabs of rock and loose boulders interspersed with grass. There are small patches of cultivation in the valleys and sheltered corners, and in the larger islands, such as Chu san, there are richly cultivated plains and many densely populated towns. The coasts of the islands are rocky, generally faced with cliffs, and there are off-lying pinnacles, most of which are above water.

As a rule, the sea does not run high amongst the islands, but the day before the approach of a typhoon, and during its continuance, there is a heavy swell. The sea is impregnated with mud, being especially thick towards the last of the ebb or east-going stream, and sunken dangers cannot be seen. Pinnacle rocks can only be detected by the rippling of the tide, but often there is no indication of their existence.

Fog is not uncommon from March to July inclusive. No attempt should be made to proceed amongst these islands during fog; owing to the strong tidal streams a vessel touching the ground may at once heel over.

Tidal streams.—The tidal streams around and between the islands are very rapid, sometimes attaining a rate of 8 knots, and the numerous tide-rips are dangerous for boats when there is much wind. The direction of the tidal streams eastward of Chang tao, at the northern end of the archipelago, is rotatory, turning with the hands of a clock, but in the passages between the islands, in the entrance to Hangchow bay, and close to the mainland, it follows the contour of the coast.

When clear of local influences, the following is a broad guide:—For 2 hours after low water the tidal stream sets in directions between south and west; from 2 hours after low water until high water, between west and north; for three hours after high water, between north and east; from 3 hours after high water until low water, between east and south.

Charts 1199, 2412, 1262.

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Chart 1429.

SOUTHERN GROUP.—The Chusan Archipelago may conveniently be divided into two main sections, the southern group and the northern group. The description of the southern group given hereafter includes Chu san, the largest island of the archipelago, and all the islands, with the intervening channels, which lie between it and Luhwang shan.

Chart 1199.

Breakers reported.—The *Koan Maru* reported, in 1910, that breakers were seen in Lat. 29° 43′ N., Long. 123° 09′ E.; the position is doubtful.

Chart 1429.

Islands eastward of Luhwang shan.—Mun dun san (*Lat. 29° 38′ N., Long. 122° 13′ E.*), the southernmost island of the Chusan archipelago, lies about 1¾ miles south-eastward of the south-east point of Luhwang shan. Between Mun dun san and Mo ta tao, an island about 3 miles northward, are Bustle island, Bang island, Cuff island, Long dun san, and Dur ming san, as well as several islets and rocks. Port Rouse, between these islands and the eastern end of Luhwang shan, is a convenient place for vessels proceeding through Tau sau mun to await favourable tidal streams.

Mo ta tao is separated from Long dun san, Dur ming san, and the north-east coast of Luhwang shan by Perth passage, a narrow channel with a least depth of 3¼ fathoms (5^{m}9) in the fairway, although the depths are considerably more in the greater part of it. Beak head, the eastern extremity of Mo ta tao, is a peninsula joined to the main part of the island by a long, narrow isthmus. Two rocks, one of them 34 feet (10^{m}4) high, lie within a distance of 2 cables from the southern extremity of the peninsula, and Beak reef, with three islets on it, extends nearly three-quarters of a mile from its eastern side. Two reefs, awash at high water, lie about 3 cables off the northern side of the main part of Mo ta tao. Gull island, Ho mun and Lung dun lie close off the north coast of the island.

Tau sau mun.—Tau sau mun is bounded on its southern side by Mo ta tao and the north-east coast of Luhwang shan, and on its northern side by Ho ji and the islands and reefs north-westward of it. Vernon point, the south-east point of Ho ji, lies about 3 miles north-north-eastward of Beak head; close within the point is a rugged hill, 612 feet (186^{m}5) high, strewn with large granite boulders. Immediately southward of Symonds point, situated about three-quarters of a mile northward of Vernon point, is the entrance to a narrow cove, which penetrates the island for about three-quarters of a mile in a westerly direction and affords shelter for boats.

Chu mor dong lies between Ho mun and the south-west coast of Ho ji; an islet lies close off its south-east point, and another islet lies close off its western end. Tau sau mun runs between Ho mun and Chu mor dong, and its width here is narrowed to about 4 cables by Mogs reef, which lies between Ho mun and Gull island; a rock on the northern part of this reef is always above water. Hobart channel, which communicates with Hea chi mun, lies between Chu mor dong and Ho ji, and in it are Kennedy rock, MacPherson islet and Annie islet, as well as several other islets and reefs, which render the channel intricate, and it should not be used without local knowledge.

A reef extends about 3 cables north-westward from the west point of Lung dun, and just within its outer edge is Jin mo dun, a rock which

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Chart 1429.

dries 13 feet (4m0). Ma mau chea and Li mau chea are two islets lying on the drying mud flat extending from the north-east coast of Luhwang shan and about one mile and 1½ miles, respectively, westward of Jin mo dun; Yuen, a rock 10 feet (3m0) high, lies nearly 1½ miles north-westward of Li mau chea.

Fo jia is an island on the northern side of Tau sau mun, and lies about 1¾ miles north-westward of Chu mor dong; Dot islet lies about 3 cables south-eastward of the east point of Fo jia. Nunpi, Steer islet, Tsuh, Forbes islet, and Pai rock, which lies nearly 3 miles north-westward of Fo jia, form the north-eastern side of the channel; north-eastward of these islets are Ho a bung and Si pa ling, two islands lying close together.

Rugged rock (*Lat. 29° 46′ N., Long. 122° 08′ E.*), on the south-western side of the channel and about 1½ miles north-north-westward of Yuen, is 91 feet (27m7) high and is surrounded by foul ground. Bangor point is on the Luhwang shan coast about three-quarters of a mile north-westward of Rugged rock, and Cape Luhwang, the northern extremity of Luhwang shan, is about one mile north-north-westward of Bangor point.

The fairway of Tau sau mun is deep throughout. Vessels proceeding through this channel from the eastward should steer to pass southward of Chu mor dong and Fo jia, and thence midway between Cape Luhwang and Pai rock; if the north-west-going tidal stream is running, vessels should guard against being set towards this rock. Good anchorage can be obtained, in a depth of 10 fathoms (18m3), north-westward of Fo jia.

Hea chi mun.—Hea chi mun lies between Ho ji and Tau hwa shan, and is entered from the eastward between Symonds point and the south-east point of Tau hwa shan, about 1½ miles northward. Tau hwa shan is a bold, precipitous island; near its north-western extremity is a peculiar vertical crag, 873 feet (266m1) high.

About 4½ miles within the entrance Hea chi mun is divided into two passages by Si a sor and Jan pai, two islands lying close together and connected by a ridge with depths of less than 3 fathoms (5m5); both these passages are deep, The passage southward of Jan pai is bounded southward by Lyne rock, which dries 2 feet (0m6), Saban, a rock one foot (0m9) high, and the islets Tsu tsi and Tung pau. The channel northward of Jan pai is about 4 cables wide between a rock, which dries 7 feet (2m1), lying about half a cable off the north coast of this island, and the Scott islets, which lie close off the south-west coast of Tau hwa shan.

The north-western entrance to Hea chi mun is divided into three channels by Lu mo yung, and by a group of islets comprising Kynaston islet, Do pa ling, and Do a bung; all three channels are deep.

Anchorages.—Tidal streams.—A large bay on the north-eastern side of Ho ji, in which are a few islets and reefs, affords anchorage in a depth of about 4 fathoms (7m3). Anchorage can also be obtained off the southern side of Jan pai.

The tidal streams in Hea chi mun set north-westward from 3½ hours before until 2½ hours after high water, and south-eastward from 2½ hours after high water until 3½ hours before the next high water; the maximum rate of both streams is from 4 to 5 knots.

Charts 1199, 2412, 1262.

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Chart 1429.

Sarah Galley channel.—The navigation of Sarah Galley channel, the next channel northward, is more intricate than either Tau sau mun or Hea chi mun; it is entered from south-eastward between Agnew point, the south-east point of Tau hwa shan, and Cambria point, the southern extremity of Chukia shan, situated about 5½ miles north-eastward. Laush, a steep, cliffy islet, with foul ground extending about 2 cables from its south-eastern side, lies in the entrance and about 3 miles east-north-eastward of Agnew point. Half-tide rock, which dries 11 feet (3m4), lies about 1¼ miles north-westward of Laush.

Usha island, on the north-eastern side of Sarah Galley channel and about 2 miles westward of Cambria point, has steep and cliffy coasts; its western extremity is fringed by rocks, and Leek islet lies about 2 cables off its eastern side. A rock awash lies about 4 cables south-eastward of Leek islet, and a rock, which dries 2 feet (0m6), lies in the middle of the northern entrance to the channel between this islet and Usha island. Cambrian pass, between Usha and Sik fong, the southern part of Chukia shan, is about 2 cables wide, and the tidal streams through it attain rates of from 3 to 5 knots. Channel rocks are two small rocky patches, awash at high water, lying about 6 cables west-north-westward and north-westward, respectively, of the west point of Usha island.

Do ying pu sa is separated from the north-eastern extremity of Tau hwa shan by a channel about a quarter of a mile wide; owing to the strong tidal streams and the uneven bottom this channel is unsafe.

Tang fow lies nearly one mile northward of Do ying pu sa and there are several islets and rocks in the channel between, rendering it unsafe for navigation. Silautse lies about one mile westward of the west point of Tang fow, and the channel between is mostly occupied by shoals and rocks.

Rambler channel, bounded on its southern side by the north coast of Tau hwa shan, and on its northern side by the south coast of Tang fow and Silautse, is deep in the fairway, but at times it is almost blocked by fishing nets. Rambler spit, with depths of less than 2 fathoms (3m7), extends about half a mile northward of the western end of Tau hwa shan; Sinte (*Lat. 122° 52′ N., Long. 122° 14′ E.*) lies in the western entrance to the channel and about half a mile westward of the south-west point of Silautse.

Freemantle channel separates Tang fow from the western side of Chukia. Tien is an islet on the western side of the southern entrance, and lies about 3 cables off the south-east point of Tang fow; a shoal, with a depth of less than 3 fathoms (5m5), and a rock, 70 feet (21m3) high, on it, extends about half a mile eastward from the coast south-westward of this point. A shoal, with a depth of 3½ fathoms (5m9), extends about a quarter of a mile northward from Tien. Yung is a steep-to islet on the western side of the channel and about half a mile northward of Tien. Russel islet lies on the eastern side of the channel and about a quarter of a mile northward of the west point of Sik fong; a sunken rock lies close off its south-western end. Hut islet, with a house on its summit, lies nearly three-quarters of a mile northward of Russel islet; a rocky reef extends about 2 cables from its southern end. Another islet lies close north-eastward of Hut islet. Two Hummock island, the Duck islands, and several islets and rocks, lie within a distance of one mile off the north coast of Tang fow; Freemantle

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Chart 1425.

channel runs eastward and northward of Two Hummock island, and thence between the Duck islands and Lu shi san, an islet off the south eastern extremity of Chu san nearly 1½ miles northward. Large quantities of stout fishing stakes were observed, in 1934, northward of Silautse ; vessels should pass Lu shi san within a distance of 4 cables to avoid them.

Directions.—Tidal streams.—Vessels proceeding through Sarah Galley channel from the southward usually pass westward of Laush, taking care to avoid Half-tide rock, and thence between Usha island and Channel rocks, and through Freemantle channel. When rounding Two Hummock island vessels should keep Lu shi san bearing not less than 295°, so as to clear the mud flat extending from the northern side of the channel.

The tidal streams set north-westward through Sarah Galley channel from 3½ hours before until 2½ hours after high water, and south-eastward from 2½ hours after high water until 3½ hours before the next high water ; the maximum rate is about 3 knots.

Chukia shan.—Chukia shan is divided into two parts, the northern part being Tong sing, and the southern part Sik fong. At the southern end of Sik fong are four remarkable peaks, and near the middle of the island is Chukia peak, a prominent smooth-topped cone.

A mud bank, which dries, extends for as much as 2½ miles from the western side of Tong sing, and on it are the islands U sau mun, Fung si jok and Ping ku ; a narrow channel, with a depth of a few feet in it, runs through this mud flat in a north and south direction. A stone pillar beacon stands on Chu choi reef, lying about 4 cables north-westward of the north-western extremity of Fung si jok.

Wolf bay, on the eastern side of Sik fong, is shoal, but affords anchorage to small craft in the north-east monsoon ; some islets and rocks lie in its south-western part. Drayson islet lies close offshore on the northern side of the bay ; rocks extend about a quarter of a mile from its southern side and terminate in Red islet. Rocky islet lies about half a mile eastward of Red islet, and a reef extends about 2 cables southward from it ; Wolf rock, with a depth of less than 6 feet (1^m8), breaks with easterly winds and sea, and lies about 4 cables south-westward of Rocky islet.

Pelican point is situated about 3½ miles north-north-eastward of Cambria point. A rock, with a depth of less than 6 feet (1^m8), lies about half a mile southward of Pelican point, and Tooth rock, 60 feet (18^m3) high, lies about 4 cables east-north-eastward of this point.

Yangsi is an islet lying close off the north-east point of Tong sing. Chakian, an islet with two rocks above water off its northern side, lies about a quarter of a mile off the north-west point of Tong sing.

Islets and dangers eastward of Chukia shan.—Lights.—Pillar rock (*Lat. 29° 51′ N., Long. 122° 26′ E.*), about 1½ miles east-north-eastward of Cambria point, is 98 feet (29^m9) high and peaked ; foul ground extends about 2 cables north-eastward from this rock. Pelican rock, which dries, lies about 2¼ miles north-eastward of Pillar rock, and is usually marked by breakers.

Piting lies about 4¾ miles north-eastward of Pillar rock ; two rocks above water lie off the north-western side of this islet, and a reef extends nearly 2 cables from its northern side.

Tongting lies about 3½ miles east-south-eastward of Piting and is

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To face page 245.

Chusan archipelago.

Tongting from southward.
(*Original dated 1932*).

Summit, bearing 351°, *distant* 4 *miles.*

Video from southward.
(*Original dated 1888*).

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Chart 1429.

the outermost islet in this locality. This islet is cleft in two from north to south, and is bare and rocky except for some small cultivated plots on the western side of the main and eastern parts; two detached rocks above water lie off the western end of the islet. *See* view facing this page.

A light is exhibited, at an elevation of 180 feet (54m9), from a white circular tower, 28 feet (8m5) in height, situated on the summit of Tongting. A fog signal is sounded from the lighthouse.

Lakea lies with its southern extremity about 2½ miles north-north-eastward of Pelican point, and is separated from the eastern side of Tong sing by Iffland channel, which is deep in the fairway. Lakeati is an islet lying close off the south-eastern point of Lakea, and a rock, with a depth of 1¾ fathoms (3m2), lies close off the south point of Lakea. Pi sha is connected to the north-west coast of Lakea by a reef. Eccles islet lies about a quarter of a mile eastward of the north point of Lakea, with foul ground between. Loka lies about 4 cables northward of Pi sha.

A light is exhibited, at an elevation of 128 feet (39m0), from a white circular stone tower, 29 feet (8m8) in height, situated on the north point of Loka.

East islet, 13 feet (4m0) high, lies about 4 miles eastward of Loka; it is covered by a *red* sector of Loka light between the bearings 256° and 273°.

Islands and dangers northward of Chukia shan.—Light.— Pu tu, the sacred island of the Chusan archipelago, lies with its south-east point about 2½ miles westward of Loka; it is separated from the bank which extends from the northern side of Tong sing and the eastern side of Chu san by Linhwa yang, a channel with depths of from 6 to 14 fathoms (11m0 to 25m6) in the fairway. Anchorage can be obtained off the southern side of Pu tu, in depths of from 12 to 14 fathoms (21m9 to 25m6), good holding ground; the maximum rate of the tidal streams at neap tides is stated to be 3 knots. Landing can be effected at a stone jetty extending from the south coast of the island, where there is a depth of 6 feet (1m8). Between the south-east point of Pu tu and the east point of this island there is a shallow bay, with a sandy beach at the head. Cawston rock, which dries, lies about 1½ cables southward of the east point of the island. Hochung rock, a pinnacle with a depth of 1¾ fathoms (3m2), lies about one mile east-south-eastward of the same point; this rock is covered by a *red* sector of Loka light between the bearings 088° and 202°. A bank, with depths of less than 3 fathoms (5m5), extends about half a mile from the western side of Pu tu and about one mile from its northern side; an islet, 213 feet (61m9) high, lies on this bank and close off the north point of the island. In 1937 it was reported that the light on the jetty did not exist.

A light is exhibited from the jetty on the south coast of Pu tu, and a light is exhibited from the summit, 939 feet (286m3) high, of the island. In 1937 it was reported that the light on the jetty did not exist.

Isthmus island lies about three-quarters of a mile eastward of the northern extremity of Pu tu, and there is a deep channel between; Joseph islet (*Lat. 30° 03′ N., Long. 122° 24′ E.*) lies in the northern entrance of this channel, and there is a deep channel on either side of it. Helby rock, a pinnacle with a depth of 3¼ fathoms (5m9), lies about 2 cables southward of the south point of Isthmus island. A

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Chart 1429.

rock, 6 feet (1m8) high, lies about 3½ cables eastward of the east point of the island, and a reef extends a quarter of a mile south-westward from this rock. Grant rock, with a depth of 3½ fathoms (6m4), lies nearly three-quarters of a mile eastward of the north point of the island; a reef extends about 4 cables northward from this point, and near its outer end is Marines islet, a black rock 30 feet (9m1) high. Andrews rock, about 3 cables north-north-eastward of Marines islet, has a least depth of 1½ fathoms (2m7), and is marked by tide-rips.

Chart 2974.

Pu pi san, nearly 2 miles east-north-eastward of Marines islet, is an islet covered with grass, and has a well defined summit.

Shalu rocks are a group of four conspicuous black rocks and five smaller ones, with some sunken rocks around. The south-western and highest rock lies nearly 1½ miles south-eastward of Pu pi san and is sharp, precipitous, and 54 feet (16m5) high; foul ground extends about 2 cables south-westward from this rock. There is a clear passage, nearly half a mile wide, between this rock and those forming the north-eastern part of the group, but it is not advisable to make use of it, and the same applies to the passage between these rocks and Pu pi san. Two pinnacles, with depths of 6 feet (1m8) and 3 fathoms (5m5) over them, respectively, lie within a distance of 2½ cables north-north-eastward of the northern rock of the group, and there are two rocks, one of which dries 7 feet (2m1), within a distance of 1½ cables north-eastward of the eastern rock. The Shalu rocks are steep-to, and sounding gives no warning; vessels from the southward, bound for Tai shan channel (page 253), or Chang tao harbour (page 254) may pass westward of Pu pi shan, passing fairly close to it so as to avoid Andrews rock. Shalu rocks and the islands westward are covered by a *red* sector of Loka light (chart 1429) between the bearings 088° and 202°, but the eastern limit of this sector passes close eastward of the rocks.

Charts 1429, 1199.

Chu san.—Chu san, the largest island in the archipelago, is mountainous, rising in Chu san East peak, situated in the eastern part of the island, to an elevation of 1,670 feet (509m2). The plains and many of the hills are richly cultivated, and the island is thickly populated; Tinghai city, the capital, is situated on the south coast. The summer at Chu san and in its vicinity is often damp and enervating. Tinghai harbour, on the south coast of Chu san, with its approaches, is described on pages 266—271. The west coast of Chu san is described with Blackwall channel on page 262.

Chart 1429.

South-eastern extremity of Chu san.—Off-lying islands and dangers.—The south-eastern extremity of Chu san is fronted by a number of islands and islets, connected to each other by a partly drying bank, within which is Sinkea channel, the eastern part of an inshore passage leading to Tinghai harbour (page 270). Siow kow (Siau kau), the largest of these islands, is situated about 3¾ miles westward of Entrance point, the south-east point of Chu san; several rocks, the highest being 46 feet (14m0) high, lie within a distance of 6 cables from the south coast of Siow kow; an islet, 147 feet (44m8) high, lies about half a mile westward of Siow kow, on a mud bank which extends about 1½ miles north-westward from this island and dries; two

Charts 2412, 1262.

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Chart 1429.

rocks, 35 and 42 feet (10m7 and 12m8) high, respectively, lie off the east coast of this island, and on the outer edge of a mud bank which dries.

Mautse (*Lat. 29° 56′ N., Long. 122° 16′ E.*) lies about one mile south-eastward of Siow kow, and Lokea lies about 1¼ miles eastward of Mautse; four islets lie off the south point of Lokea, on the mud flat, which dries, surrounding that island. Lu shi san is an islet about half a mile southward of Lokea; a rock, with a depth of less than 6 feet (1m8), lies about half a cable off the south-eastern side of this islet.

There is a channel about 2 cables wide, with a least depth of 3½ fathoms (6m4), between the mud flats, which dry, extending eastward from Lokea and those extending westward from Tong sing; the eastern side of this channel, opposite Entrance point, is marked by Chu choi beacon (page 244). A rock, with a depth of 2 feet (0m6) over it, lies in the southern entrance to this channel and about 1¼ miles southward of Chu choi beacon. The flat in the northern approach to this channel can be crossed in a least depth of 1½ fathoms (2m7). The north-going stream in this channel runs from 3½ hours before until 2½ hours after high water, and the south-going stream from 2½ hours after high water until 3½ hours before the next high water; the maximum rate is from 3 to 4 knots.

Anchorage.—Small vessels with local knowledge can obtain anchorage in Sinkea channel, in a depth of 5½ fathoms (10m1), off the town of Sinkeamun, situated on the northern side of the channel opposite Lokea; this harbour affords shelter in a typhoon. The south-western entrance, between Mautse and the mud flat extending westward from Lokea, has a depth of 2½ fathoms (4m6); a rock, with a depth of less than 6 feet (1m8), lies about one cable off the eastern side of Mautse. *See* also page 266.

In 1936, H.M.S. *Berwick* anchored south-westward of Siow kow, with the summit of Mun du san, an islet about 2½ miles westward of Siow kow, bearing 308°, distant about 2¼ miles; the holding ground was good, but the anchorage is unsheltered and the tidal streams were sufficiently strong to prevent the vessel swinging to the wind.

East and north-east coasts of Chu san.—Off-lying islands and dangers.—Hwang head, the eastern extremity of Chu san, is situated about 4½ miles north-north-eastward of Entrance point and on the western side of Linhwa yang (page 245); it is a peninsula 193 feet (58m8) high, connected to the main island by a low isthmus. Lilion islet, on the edge of the mud flat, which dries, extending from this part of the coast, lies about one mile southward of Hwang head and nearly half a mile offshore. A rocky patch, which dries, lies about 1½ miles north-westward of Hwang head and 3 cables offshore; about three-quarters of a mile farther north-westward is an islet named Ta chen. Chenau point, the north-east point of Chu san, is about 3¾ miles north-westward of Hwang head.

Chart 2974.

Tsae, an island, lies with its south point about three-quarters of a mile northward of Chenau point, and there is a rock 39 feet (11m9) high, and some sunken rocks, between. Tsae has two conspicuous hills on it, each about 600 feet (182m9) high; the western side of the island is cultivated, and the eastern side is very steep and is covered with grass. Hwa islet, with some rocks above water close off its northern end, lies close off the north point of Tsae. An islet, 114 feet

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Chart 2974.

(34m7) high, with a rock awash close off its eastern side, lies nearly three-quarters of a mile westward of Hwa islet. Fossett rock, with a depth of 2¾ fathoms (5m0) and steep-to, lies about half a mile north-north-eastward of Hwa islet; during the strength of the tidal streams this rock is marked by tide rips. A rock, 4 feet (1m2) high, lies about there-quarters of a mile eastward of Hwa islet.

Mei yun, an island, lies about 3 cables eastward of the east point of Tsae, and has a well defined summit; there is a deep passage between it and Tsae. Mei ting lies about three-quarters of a mile east-south-eastward of Mei yun; there is foul ground for about 3 cables off its north-west point. Eaves rock, about 4 cables eastward of Mei ting, is 27 feet (8m2) high. Jau islet lies nearly 1¼ miles north-eastward of Eaves rock; rocks lie within about a cable of its east, north, and west points. The passage between Jau islet and Eaves rock is safe for vessels of any draught, but vessels bound for Tai shan channel usually pass north-eastward of the islet; the passages between Eaves rock and Mei ting, and between Mei ting and Mei yun, should not be attempted.

The coast between Chenau point and Kanlan point (*Lat. 30° 07′ N., Long. 122° 10′ E.*), about 7 miles north-westward, is indented with several bays, but they are all filled with mud flats. Thornton island lies on the mud flat, which dries, extending from a point situated about 3½ miles north-westward of Chenau point; there is a joss-house, surrounded by a wall, on the summit of the island. This island is cultivated, and there is a village on its southern side; foul ground, with an islet on it, extends about half a mile north-eastward from the island, and a 5-fathom (9m1) patch lies about 3 cables northward of the islet.

Su shan is a hilly island lying with its southern extremity nearly 1½ miles northward of Kanlan point. Harty islets lie on the mud flat, which dries, extending from the north-east point of Su shan, and two islets and a rock, 58 feet (17m7) high, lie within a distance of 1½ miles of the western side of the island; a bank, with depths of less than 3 fathoms (5m5), extends about 2¼ miles from the south-eastern side of Su shan.

Kwei channel, between Su shan and Chu san, is much encumbered with islets and reefs, the positions of which can best be seen on the chart; the channel is barely 4 cables wide between Kanlan point and the foul ground extending from Grain islets, which lies off the south point of Su shan, and the tidal streams are rapid. In Kwei channel the west-going stream runs from about 3 hours before until 3 hours after the time of high water at the western entrance to Changtao harbour (page 254), and the east-going stream from about 3 hours after high water until 3 hours before the next high water there.

North coast of Chu san.—Off-lying islands and dangers.—The north coast of Chu san between Kanlan point and the north-west point of the island, about 10 miles westward, is deeply indented and well cultivated.

Chang pei, an island about 4¼ miles westward of Su shan, has a central range of hills, with a well defined summit, 812 feet (247m5) high, in the north-eastern part of the island. A spit, with a depth of less than 3 fathoms (5m5), extends about three-quarters of a mile from its south-eastern side, and, in 1934, fishing stakes were found to extend

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Chart 2974.

1½ miles in an easterly direction from this spit. The west and north-west coasts of the island are indented by several bays, but they are all filled by a mud flat which dries; a spit, with a depth of less than 3 fathoms (5m5), extends about 1½ miles west-north-westward from the west point of the island. The channel between Chang pei and the north coast of Chu san is about half a mile wide, but there are some rocks, with a least depth of 3½ fathoms (5m9), in it.

Chart 1124.

Maum shan lies on the drying mud flat which extends about 2½ miles north-westward from the north-west point of Chu san, and has a scattered population. Crack island lies about three-quarters of a mile north-westward of Maum shan, and is a conspicuous, rocky island; a rocky islet, 46 feet (14m0) high, lies close off the north point of this island. The channel between Crack island and Maum shan is deep, but it is narrowed to a width of about 4 cables by a spit, with a depth of less than 3 fathoms (5m5), extending about one mile north-westward from the latter island.

Off-lying islets.—Dunsterville islets are a group of five islets, the southern and largest of which lies about 2½ miles north-westward of Crack island. The depths around these islets are very irregular, and the tidal streams are rapid.

NORTHERN GROUP.—The northern group of the Chusan archipelago includes the chain of islands which extends nearly 50 miles westward from Video, the easternmost island of the archipelago, and terminates in Yu hsing nao (West Volcano island).

Video.—Anchorages.—Video, the easternmost island of the Chusan archipelago, lies about 19 miles north-eastward of Loka (page 245); it is an excellent landmark, and is the best island of the group to make from the southward, as it is very steep on that side. The island is covered with boulders of porphyritic rock, interspersed with grass. The east point rises in vertical cliffs to an elevation of from 300 to 500 feet (91m4 to 152m4), and there are three remarkable tors on the ridge which connects it to the summit. On the northern side of the island there is a conspicuous dome-shaped white patch on the rocks, which may sometimes be discerned through mist on sunny days. *See* view facing page 245.

Several rocks lie close to the coast around the island. Piggott rock (*Lat. 30° 08′ N., Long. 122° 45′ E.*), off the west coast, is 77 feet (23m5) high; the Twins, 26 and 30 feet (7m9 and 9m1) high, respectively, lie off the north-east point.

There is a small fishing population. The principal landing place, used by the fishing boats, is a small cove situated between two off-lying rocks at the north-western extremity of the island, where there is a small village; there is also a village at the head of a bay on the northern side of the island.

There is open anchorage for vessels with local knowledge off the south-west coast of Video, in depths of from 13 to 17 fathoms (23m8 to 31m1), sheltered from northerly and easterly winds; this anchorage should be approached with the summit of the island bearing 057°, anchoring when the summit of East Fisherman island (page 249) is in line with Piggott rock, bearing 327°.

There is also open anchorage for vessels with local knowledge off the north coast of Video, in depths of from 11 to 14 fathoms (20m1 to

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Chart 1124.

25m6), mud and shells, sheltered from southward and south-westward, but unsafe with northerly winds. This anchorage should be approached with the summit of the island bearing 177°, anchoring when the southern rock of the Four Sisters is in line with the northern Twin rock, bearing about 079° ; in this locality the depths increase gradually to a distance of 3 cables offshore, and then increase suddenly to 27 fathoms (49m4). .

Off-lying rocks.—Four Sisters are a group of four rocks, about 30 feet (9m1) high, the south-western of which lies about 4¼ miles east-north-eastward of the east point of Video.

Two Brothers, about 3¾ miles eastward of the Four Sisters, are two rocks about 100 feet (30m5) high.

Fisherman islands.—Fisherman islands, the nearest group to Video, consists of South, East, Middle, and West Fisherman, with many islets and rocks. South Fisherman, the south-eastern island, lies about 2½ miles north-westward of Video, with a deep passage between ; *see* Table of tidal streams on chart 1124. All the islands of this group are rocky, precipitous, and covered with grass ; they are inhabited, except South Fisherman.

West Fisherman is separated from Middle Fisherman by a deep passage about one mile wide. Wood islet, off the southern entrance of this passage, is rocky, precipitous, and barren. Kliene islet lies in the northern entrance and about 4 cables westward of the north point of West Fisherman ; a rock, which dries 12 feet (3m7), lies about 2 cables northward of the islet.

There is anchorage for one vessel, with local knowledge, about 1¼ cables off the north-west coast of South Fisherman island, in a depth of 10 fathoms (18m3), mud, with Ballard islet, situated about a quarter of a mile south-eastward of the south point of West Fisherman island, bearing 271°, and just open southward of Middle Fisherman island, and the eastern extremity of East Fisherman in line with Carles islet, bearing 357° ; Carles islet, with a number of rocks around, lies midway between South Fisherman and East Fisherman.

Vessels with local knowledge can also obtain anchorage, sheltered from northerly and easterly winds, in the entrance to the bay on the south-western side of Middle Fisherman, in depths of from 6 to 7 fathoms (11m0 to 12m8), mud, with Kliene islet (*Lat. 30° 13′ N., Long. 122° 40′ E.*) in line with the western entrance point of the bay, bearing about 324° ; rocks extend from the northern shore of the bay, and the outer of these, which dries 12 feet (3m7), lies nearly in the middle of the bay and has a depth of 5 fathoms (9m1) close outside it.

Steep Island pass.—Light.—Steep Island pass lies between West Fisherman and the Palmer islets on the east, and Tripod island and Steep island on the west ; it is the most frequented of the various passages between the islands westward of Video, as it is free from danger and is deep throughout. *See* view on chart 1124.

Palmer islets are a group of three islets lying off the north-western end of West Fisherman island ; two of them lie close together, and the inner and larger of these lies about 2 cables off the west point of West Fisherman. The third islet lies about half a mile south-westward of the same point.

Tripod island, about 2½ miles westward of West Fisherman island, has three peaks, the southernmost and highest being 355 feet (108m2)

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Chart 1124.

high; a vertical cliff, about 250 feet (76m2) high, on the south-eastern side of the island, is noticeable on north-easterly or south-westerly bearings. Steep island lies close northward of Tripod island, and has a remarkable boulder on its southern slope. Andersen rock, about 3 cables north-westward of Steep island, is a pinnacle with a depth of 4 feet (1m2) over it; the sea never breaks on this rock, but there are generally tide-rips in the strength of the tidal streams.

A light is exhibited, at an elevation of 243 feet (74m1), from a black circular tower, 47 feet (14m3) in height, situated on the summit of Steep island; the keepers' dwelling is white. A fog signal is made from the north-eastern side of the island.

Charts 2974, 1124.

Islands and passages between Tripod island and Chang tao.—Between Tripod island and Chang tao major, about 9 miles west-north-westward, there are numerous islands, islets, and rocks, amongst which are Brenan island, Hewett islands, Medusa, Hall and Bees islands, Hertz islands, Will, Muran and Tsinghi islands. Hall island, the largest of these, lies about 4½ miles west-north-westward of Tripod island, and has two summits with a saddle between.

Brenan pass, between Tripod and Brenan islands, Hewett pass, between the Hewett islands and Medusa island, and Hall pass, between Medusa island and Hall island, are available for steam vessels, but they are seldom used except by junks, the route through Steep Island pass being usually taken.

The passages between the various islands which lie between Hall island and Chang tao should not be attempted, as there are many dangers and the tidal streams are strong.

Anchorages.—The particulars of anchorages given hereafter, for vessels with local knowledge, may be useful:—One small vessel can obtain anchorage in a small bay on the north-western side of Tripod island, sheltered from southerly and south-easterly winds, in depths of from 6 to 14 fathoms (11m0 to 25m6), mud, with the north point of West Fisherman island in line with the south point of Steep island, bearing 080°, about 3 cables offshore.

Anchorage can be obtained off the south-west coast of Hall island, sheltered from northerly and easterly winds. There is a depth of 10 fathoms (18m3) half a mile offshore, shoaling gradually to one fathom (1m8) close in, the bottom being soft mud; in order to keep out of the strong stream, setting in a south-easterly direction through the gap between Hall island and Hertz islands, the summit of Will island (*Lat. 30° 15′ N., Long. 122° 28′ E.*) should not be opened westward of Hall island.

There is an excellent boat harbour on the northern side of Hall island, with a depth of 3 fathoms (5m5) in its entrance, shoaling to one fathom (1m8) at the head, and sheltered from east to west-north-west, through south. There is good anchorage, in depths of from 10 to 14 fathoms, (18m3 to 25m6), mud, off this boat harbour.

Chart 2974.

Chang tao.—Off-lying islets and dangers.—Chang tao consists of the two islands Chang tao major and Chang tao minor, separated from each other by a narrow strait known as Chang tao harbour (page 254). Chang tao major is nearly divided into two parts by a bay the southern side of which is, however, almost entirely filled by a drying

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Chart 2974.

mud flat. The highest peak of the island, 940 feet (286m5) high, is situated on the western side of this bay. Eden point is the south point of a promontory, 575 feet (175m3) high, which forms the south-eastern extremity of Chang tao major; an islet, 241 feet (73m5) high, lies nearly three-quarters of a mile north-westward of Eden point, and a rock, which dries 8 feet (2m4), lies close off the southern side of this islet.

Ing longa, about 2¼ miles westward of Eden point, is a pyramidal-shaped islet; a rock, 5 feet (1m5) high, lies close off its south-east point. Anchorage can be obtained north-eastward of Ing longa, in depths of from 3 to 6 fathoms (5m5 to 11m0) mud, sheltered from west to east-north-east, through north. Grass island, about three-quarters of a mile westward of Ing longa, is of much the same colour as Chang tao major, and, as it lies close to the coast of that island, it does not stand out plainly; an islet, 112 feet (34m1) high, lies close off the south-west point of Grass island. Brenan rock, about one mile southward of Grass island, is a pinnacle with a depth of 2 fathoms (3m7) and is steep-to; the sea never breaks on this rock, and there are no indications of its existence.

An islet, 137 feet (41m8) high, lies about 2½ cables southward of the south-west point of Chang tao major. Black rocks, thirteen in number, extend about half a mile southward from this islet; the highest of these rocks, 29 feet (8m8) high, lies about one cable within the outer end of the group, and there are three rocks outside it which cover. Fuller rock, with a depth of 1½ fathoms (2m3), lies about half a mile westward of the highest Black rock. Chua bek san lies about half a mile westward of the 137-foot (41m8) islet, and the space between is almost entirely occupied by shoal ground; Chua bek san has a curious gap in it, open on north-westerly and south-easterly bearings. A rock, which dries 7 feet (2m1), lies nearly one cable westward of the south-west point of Chua bek san, and a similar rock lies close southward of the same point. Yua san lies close northward of Chua bek san, and its eastern extremity is close off the south-west point of Chang tao major; it has a well-defined summit 291 feet (88m7) high. Yua san spit is a sandbank extending fully half a mile from the northern side of the islet, leaving a boat channel between it and the western end of Chang tao major. Fung shui rock, about 6 cables north-westward of the south-west point of Yua san, is 6 feet (1m8) high and steep-to on its north-western side.

Green rock, with a depth of less than 6 feet (1m8), lies about 2 cables north-north-eastward of the north-east point of Chang tao major. Wasp island lies about a quarter of a mile off the middle of the north coast of Chang tao major; the Hornets, a rocky reef which dries from 8 to 10 feet (2m4 to 3m0), lies about three-quarters of a mile westward of Wasp island.

Chang tao minor is well populated, and there are several villages on its southern side; the summit of the island, 976 feet (297m5) high, is in the north-western part of the island and is conspicuous. Cock-chafer islet (*Lat. 30° 16′ N., Long 122° 16′ E.*) lies about a quarter of a mile north-eastward of the north-west point of Chang tao minor.

Islets and dangers in the southern approach to Tai shan channel.—Kau pei, about 3½ miles south-eastward of Chua bek san, is a double rock, covered with grass on the top, with sufficient space between the two parts at high water to permit a small boat to pass

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Chart 2974.

through. Shio kau pei, about 4 cables west-north-westward of Kau pei, has a gap in the middle, which is conspicuous on south-easterly and north-westerly bearings; a pinnacle rock, with a depth of 3 fathoms (5m5), lies about 1¼ cables eastward of Shio kau pei. The tidal streams around Kau pei are rapid and variable, and steam vessels of low power and sailing vessels should give this rock a berth of half a mile.

Ryrie rock, about 1¼ miles westward of Shio kau pei, is a pinnacle with a depth of 3½ fathoms (6m4) and is steep-to; there are no indications of the existence of this rock.

Mung du san, nearly 2¾ miles west-north-westward of Shio kau pei, is a rocky, precipitous islet. Ta chio, a broken, barren mass of rocks, lies about 2½ cables south-eastward of Mung du san, with foul ground between. Ryder rock, a pinnacle with a depth of 5 feet (1m5), lies about 3½ cables eastward of Ta chio, and a rock, with a depth of 1½ fathoms (2m7), lies between. A rocky patch, which dries 10 feet (3m0), lies close off the north point of Mung du san.

Chuma kat chi, about 6½ cables west-north-westward of Mung du san, is an islet 86 feet (26m2) high, surrounded within a distance of about a cable by rocks and foul ground, except on its south-eastern side.

Tai shan channel.—Islets and dangers.—Tai shan channel, between Chang tao and Tai shan, is deep in the fairway, mud bottom; it requires careful navigation, but is useful for steam vessels, and leads to Chang tao harbour.

The east coast of Tai shan, forming the western side of the channel, is indented by bays, but they are completely filled by mud flats. Pu, Ta pu ma, and Ya pu ma are three rocky, precipitous islets, covered with grass, lying on a mudbank off the south-east point of Tai shan; three small islets lie close off the south-western side of Pu.

Baylis rock, with a depth of 4 feet (1m2) over it, lies on the eastern side of the fairway and about 3 cables westward of the south-west point of Chang tao minor; Mitchell rock, also on the eastern side of the fairway, has a depth of 4 feet (1m2), and lies about 2 cables westward of the north-west point of that island.

Gansu and Maxwell islands lie in the northern entrance of Tai shan channel, and a bank of mud, with depths of less than 5 fathoms (9m1), extends nearly three-quarters of a mile south-westward from them; rocks above water and rocks which dry extend about 3 cables westward from the west point of Gansu. A rock, with a depth of 2 fathoms (3m7), lies about three-quarters of a cable eastward of the east point of Maxwell island, and a similar rock lies about 1¼ cables northward of this point. Singleton spit is a bank of black sand extending about one mile north-eastward from Gansu island; there is a depth of 3¾ fathoms (6m9) at the outer end of this spit.

The north-going tidal stream in Tai shan channel runs from about 3 hours before to 3 hours after high water, and the south-going stream from about 3 hours after high water until 3 hours before the next high water; the maximum rate of both streams is from 4 to 5 knots.

Directions.—Vessels making for Tai shan channel from the southward, after passing Kau pei (*Lat. 30° 11′ N., Long. 122° 18′ E.*), should approach the southern entrance with Pu pi san (page 246) bearing 132° astern, and seen midway between Kau pei and Shio kau pei; if Pu pi san is not visible, Kau pei should be kept bearing 130°

Charts 1124, 1199, 2412, 1262.

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Chart 2974.

astern. When the west point of Gansu is in line with a small islet lying about one cable westward of the south-west point of Chang tao minor, bearing 353°, keep this mark on until Fung shui rock bears about 040°, when steer a north-westerly course so as to pass westward of Baylis rock; the summit of Yua san should be kept open southward of Fung shui rock until the eastern extremity of Maxwell island is open of the western side of Chang tao minor. After passing Baylis rock a mid-channel course may be steered until the eastern extremity of Maxwell island bears 040°, when steer for it on that bearing and pass not less than 2 cables south-eastward of this island; the western extremity of Mung du san bearing 184°, and just open westward of the western side of Chang tao minor, leads westward of Mitchell rock. The western extremity of Chang tao island bearing 197°, and open eastward of Maxwell island, leads close eastward of Singleton spit.

Vessels making for Tai shan channel from the northward should steer for the north-west point of Chang tao minor bearing 214°, until the northern sides of Gansu and Maxwell islands are in line, bearing about 292°; then steer about 242° until the western side of Mung du san is open westward of the western side of Chang tao minor, when the directions given for vessels from the southward can be followed in the reverse order.

Chang tao harbour.—Chang tao harbour, the narrow strait between Chang tao major and Chang tao minor, is completely land-locked, and affords anchorage for several vessels in depths of from 5 to 13 fathoms (9m1 to 23m8); it is an excellent refuge in a typhoon, and is the best in the approach to the Yangtze kiang. The harbour is available for vessels drawing not more than 24 feet (7m3); vessels drawing 16 feet (4m9), provided they are moderately short, can enter by either entrance, but larger vessels must enter from Tai shan channel, as the eastern entrance has a sharp turn, where it is difficult to handle vessels of any size in the strong tidal streams.

The best anchorage is off the middle of the southern side of Chang tao minor, where the strait is nearly 3 cables wide, with depths of from 4 to 7 fathoms (7m3 to 12m8). In a typhoon vessels moor with from 40 to 50 fathoms (73m2 to 91m4) on each cable up and down stream, as the tidal streams cause a single anchor to foul; the sides of the harbour are of mud and are steep-to, so that a vessel may not sustain much damage even if the cable parts. No swell is felt in the harbour, but on the approach of a typhoon, and during its continuance, the easterly swell curls on Chua bek san and breaks on Yua san spit.

The tidal streams run in the direction of the harbour, the east-going stream from about 3 hours before until 3 hours after high water, and the west-going stream from 3 hours after high water until 3 hours before the next high water; the maximum rate is from 2 to 3 knots at spring tides, but in the western entrance they may attain a rate of 5 knots.

Directions.—Small vessels can enter or leave Chang tao harbour by either entrance at any state of the tide, but vessels exceeding 200 feet (61m0) in length should do so at slack water.

Vessels from the southward, entering from Tai shan channel, can proceed as directed for that channel, continuing with the west point of Gansu island in line with the small islet lying about one cable westward of the south-west point of Chang tao minor, bearing 353°

Charts 1124, 1199, 2412, 1262.

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Chart 2974.

until Fung shui rock (*Lat. 30° 14′ N., Long. 122° 15′ E.*) is abeam; thence steer for the entrance of the harbour, passing from a half to one cable northward of Fung shui; when past this rock bring it in line with the south-eastern extremity of Ya pu ma, bearing 226° astern, so as to clear Yua san spit. A rocky point on the northern side of the harbour, and about 7 cables north-eastward of Fung shui rock, should be passed at a distance of three-quarters of a cable; thence hold this shore, which is mud and steep-to, until past a rock, which dries 10 feet (3m0), lying on the southern side of the harbour and about half a mile eastward of the rocky point. A mid-channel course can then be steered, anchoring before reaching the fishing stakes off a joss-house on the southern side of the harbour. The navigable channel abreast Fung shui rock is only about 1¼ cables wide.

The eastern entrance is difficult to identify from seaward, but it can be approached by keeping the summit of Ta chu san (page 280), situated in the south-western part of that island (chart 1124), bearing 000° astern. An islet, 126 feet (38m4) high, lies close off the north-eastern side of Chang tao minor. The channel lies between this islet and the bluff north-west point of Chang tao major, and is here about 3 cables wide, with a least depth of 3¼ fathoms (5m9) in the fairway. When entering, the bluff point of Chang tao major should be held fairly closely, thence keeping a mid-channel course up the harbour. The narrowest part of the harbour is at the sharp bend by the south-east point of Chang tao minor, where it is only about 1¼ cables wide, and great attention to the helm is necessary.

Approaching the eastern entrance from the eastward, care must be taken that the northern extremity of Wasp island does not bear less than 090° until westward of the Hornets.

The eastern entrance has several disadvantages, as besides the difficulty of identifying the entrance, and the sharp, narrow turn to be negotiated inside, numerous fishing boats and nets are to be passed before reaching the best anchorage, and they are usually very much in the way, the nets stretching half-way across the harbour abreast the joss-house on Chang tao major; in May, June, and July as many as 2,300 fishing boats have been counted in the harbour at one time.

Channels between Chu san and Tai shan.—There are several channels between the islands Chang pei and Su shan (page 248) on the south, and the southern side of Tai shan on the north; they are separated by a number of islands, islets, and rocks, between which these channels are narrow, intricate, and deep. Many of the islands have no distinguishing features, and their positions, as well as those of the numerous dangers, are best seen on the chart. Local knowledge is essential for navigation in this locality, and only a brief description will be given.

Hui pei, an islet about 2¾ miles northward of the northern extremity of Chang pei, is surrounded by foul ground for a distance of about 2 cables, and there are very irregular depths around. Shio Hui pei (*Lat. 30° 15′ N., Long. 122° 05′ E.*) is an islet nearly 1½ miles eastward of Hui pei, and a shoal, with depths of less than 3 fathoms (5m5), extends about 2 cables from its western side.

Cluster islets consist of two islets, lying on a bank with depths of less than 3 fathoms (5m5), and several rocks; the larger of the two

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Chart 2974.

islets lies about 1¼ miles north-eastward of Chang pei. A rocky patch, with a least depth of 4 fathoms (7m3) over it, lies about 4 cables north-north-eastward of the smaller islet.

To go san lies with its south-west point about 3¼ miles east-north-eastward of the east point of Chang pei, and consists of two hills, 344 and 236 feet (104m8 and 71m9) high, respectively, connected by a low, narrow isthmus. A spit, with depths of 3 fathoms (5m5) and less, extends about 1¼ miles west-north-westward from To go san, and the Read islets lie on the outer end of this spit. An islet, 168 feet (51m2) high, lies about 6 cables north-westward of the south-west point of To go san.

Kui san, about 1¼ miles eastward of To go san, has a conspicuous dome-shaped summit 628 feet (191m4) high. There are several islets in the vicinity of Kui san.

Kui san pass, along the southern side of Kui san, is navigable by full-powered steam vessels, and is the most direct route in the western approach to Tai shan channel. Herald islets lie on the southern side of this channel and close off the northern extremity of Su shan. Hamlyn rocks are a number of pinnacles lying northward and north-westward of the Herald islets; the northernmost rock dries 3 feet (0m9), and about a quarter of a mile eastward of it is a rock with a depth of 1½ fathoms (2m7). There are strong eddies and whirls in Kui san pass.

Kau ding pass is entered from the westward betweeen To go san and To chi san, an islet about three-quarters of a mile northward; a rock, 28 feet (8m5) high, lies about 1½ cables southward of To chi san. The channel then runs southward of Shio go san, an islet nearly 1¼ miles north-eastward of the east point of To go san, and thence northward of Kui san; Bujega rock, with a depth of 1½ fathoms (2m7) and steep-to, lies nearly half a mile eastward of Shio go san. Collinson island lies about a quarter of a mile eastward of Kui san; the fairway of the passage between these two islands is deep, except for Gummer rock, a pinnacle with a depth of 2 feet (0m6), which lies on the middle of the northern entrance. Kau ding pass is navigable by full-powered steam vessels, and the coast of Kui san should be held fairly closely throughout, but Kui san pass is preferable in every way.

In Kui san and Kau ding passes the tidal streams run westward from about 3 hours before until 3 hours after high water at the western entrance of Chang tao harbour, and eastward from about 3 hours after high water until 3 hours before the next high water there; the maximum rate is from 5 to 8 knots, according to the age of the moon.

Tai shan.—Off-lying islands and dangers.—Tai shan, the largest island in the northern group of the Chusan archipelago, is divided into two main portions, both lying on a flat which dries. Both parts are hilly, and the highest peak, 822 feet (250m5), lies in the south-eastern part of the eastern portion, but it is not particularly noticeable. The eastern side of the island has been described with Tai shan channel on page 253.

Devils rock (*Lat. 30° 20′ N., Long. 122° 14′ E.*), about 2 cables eastward of the north-east point of Tai shan, is black, conical, and 63 feet (19m2) high. Castle rock, the outermost of a chain of islets extending about 1¼ miles north-north-westward from the north point of Tai shan, is precipitous on its northern side and is conspicuous.

Charts 1124, 1199, 2412, 1262.

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Chart 2974.

There is a deep area close northward of Castle rock; at spring tides the tidal streams in this locality attain a rate of from 4 to 6 knots, causing whirls and eddies, and it is advisable to give the rock a berth of fully half a mile. Primmer rock, nearly 1½ miles eastward of Castle rock, has a depth of 5 feet (1m5) over it and is generally marked by tide-rips. Dumb-bell islet bearing 271°, and open northward of Castle rock, leads about a quarter of a mile northward of Primmer rock; the 940-foot (286m5) high peak of Chang tao major bearing 131°, and open north-eastward of Devils rock, leads close north-eastward of Primmer rock.

Hughes islands, two in number, lie at either end of a bank, with depths of less than 3 fathoms (5m5), which lies parallel to the north-western side of Tai shan and about three-quarters of a mile from it; this bank extends nearly half a mile westward from the northern extremity of the south-western island, and there are some rocks above water and a sunken rock on this portion. A rock, 33 feet (10m1) high, lies about 2 cables northward of the east point of the north-eastern island, and a sunken rock lies about 1½ cables westward of this rock. Anchorage, sheltered from winds between east and south-west, through south, can be obtained between the north-eastern Hughes island and Castle rock, in depths of from 4 to 10 fathoms (7m3 to 18m3), but the tidal streams attain a rate of from 3 to 5 knots. There is a navigable passage between the Hughes islands and Tai shan.

Ya do dong, separated from the western side of Tai shan by Ya do dong pass, is divided into three parts at high water. Ya do dong pass has a least depth of 7 fathoms (12m8) in the fairway; the western side should be held, as a mud bank extends from the western extremity of Tai shan, which forms the eastern side of the pass. Vessels intending to pass through this channel from the northward should approach with Shio Hui pei in line with the western extremity of Tai shan, bearing 175°, which leads clear of the shoal water which extends from the south-western Hughes island; when the northern hill of Ya da dong, 310 feet (94m5) high, is abeam, course should be altered to 188°, which leads through.

In Ya do dong pass the south-west-going stream runs from 2½ hours before until 2½ hours after high water at the western entrance to Chang tao harbour, and the north-east-going stream from 2½ hours after high water until 2½ hours before the next high water there; the maximum rate of the tidal stream is from 3 to 4 knots at spring tides.

Becher islets lie south-westward of Ya do dong, and are separated from that island by a navigable passage, fully one mile wide, with a least depth of about 4½ fathoms (8m2) in the fairway.

On the eastern side of the fairway, and about 2 cables westward of the southern part of Ya do dong, is a rock which dries 6 feet (1m8). Kestrel rock, about half a mile south-eastward of the eastern Becher islet, dries 3 feet (0m9). Drew rock, about three-quarters of a mile south-eastward of Kestrel rock, is a pinnacle with a depth of 2 feet (0m6) over it; except with very smooth water, and during the strength of the tidal streams, there is no indication of its existence. An islet, 91 feet (27m7) high, lies nearly 1½ miles northward of the western Becher islet, and a rock, 24 feet (7m3) high, lies about 3 cables south-eastward of the former islet.

Charts 1124, 1199, 2412, 1262.

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Chart 2974.

Dumb-bell islet lies about 3 miles northward of the northern extremity of Ya do dong; a rock, with a depth of 5 feet (1m5) over it, lies about half a cable southward of this islet.

Chart 1124.

Skead islets are two islets close together, the southern of which lies about 2 miles north-eastward of Dumb-bell islet; the depths around are irregular. Mariner rocks, about 2¼ miles northward of the Skead islets, are two pinnacles about 1½ cables apart; the south-eastern rock has a depth of 5 feet (1m5) over it, and the north-western 3 feet (0m9). A 3½-fathom (6m4) patch lies about 5½ miles west-north-westward of the Skead islets, and a similar patch lies about 4½ miles north-westward of these islets.,

Hsiaoyu shan.—Light.—Hsiaoyu shan (Volcano islands) is a group at the north-western end of the Chusan archipelago. Uan san, the largest and easternmost island of the group, lies with its south point about 5 miles westward of Ya do dong; it rises to a ridge with several well defined peaks, the highest, situated at the northern end of the island, being 492 feet (150m0) high. A mud bank, with depths of less than 3 fathoms (5m5), extends eastward nearly to the Becher islets; a mud bank also extends for about 3½ miles westward from Uan san, and dries over a great part. Shio chi san, with a hill in the centre 411 feet (125m3) high, and several other islands lie on the latter bank; a rock, 21 feet (6m4) high, lies outside this bank and about one mile southward of Shio chi san. An islet, 116 feet (35m4) high, lies about 2 miles northward of Shio chi san, and about half a mile farther northward is a rock 8 feet (2m4) high.

Yu hsing nao (West Volcano), about 3¼ miles north-westward of Shio chi san, is a black rock 63 feet (19m2) high, split in two, the northern part being small. Two rocks close together, which dry 4 feet (1m2), lie about one cable southward of the islet. Howlin rock, about 6 cables south-westward of Yu hsing nao, is a pinnacle with a depth of 1¼ fathoms (2m7). A reef, with three rocks on it, the highest of which is 38 feet (11m6) high, lies about three-quarters of a mile south-south-eastward of Yu hsing nao. Lake rock, about 3 cables north-eastward of the islet, consists of two pinnacles a quarter of a cable apart; the south-eastern pinnacle has a depth of 3 feet (0m9), and the north-western a depth of 2 fathoms (3m7). The tidal streams may attain a rate of 7 knots in this vicinity.

A 3½-fathom (6m4) patch lies about 1½ miles north-north-eastward of Yu hsing nao, and less depths than shown on the charts were reported, in 1910, for about 3 miles northward and north-eastward of this patch.

A light is exhibited, at an elevation of 93 feet (28m3), from a black circular tower, 33 feet (10m1) in height, on the summit of Yu hsing nao (*Lat. 30° 21′ N., Long. 121° 50′ E.*). The keepers' dwelling is white. A fog signal is sounded from the lighthouse.

Chart 1429.

INSHORE PASSAGE WESTWARD OF CHUSAN ARCHIPELAGO.—Between the Chusan archipelago and the mainland there is a route which may be used by vessels of moderate size proceeding to or from Shanghai. Vessels taking this route from the southward pass through Nu pi shan channel (page 233); the passage can be

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Chart 1429.

entered from the south-eastward through Tau sau mun (page 241), Hea chi mun (page 242), or Sarah Galley channel (page 243).

As this inshore passage is not lighted, except for the light on Yu hsing nao, it is advisable to navigate the whole area between Chiu shan lieh tao (page 234) and Hsihou men (page 263) during the daytime. The time of the moon's meridian passage at Greenwich, as shown in the Nautical Almanac, added to 7½ hours, gives the local mean time at which a vessel should be abreast Futo, situated in the southern entrance to the inshore passage, in order that vessels proceeding northward may obtain full advantage of the north-west-going tidal stream.

Coast.—The coast of the mainland between the entrance to the Ta sung kiang (page 237) and Ketau point, nearly 20 miles north-eastward, is fringed for the greater part by mud flats which dry, although the salient points along the north-eastern half of this coast are mostly steep-to.

Bateman islet, about 4½ miles north-eastward of Sail rock (page 237), is covered with grass and scrub, and has a round top; a rock, 5 feet (1^{m}5) high, lies about 1½ cables southward of the islet. Yang sor consists of two islets lying close together on the edge of the mud flat which extends nearly 2 miles offshore here; the eastern islet lies about one mile north-westward of Bateman islet, and a rock, 2 feet (0^{m}6) high, lies about 2 cables east-south-eastward of its southern extremity.

Mei shan lies with its south point about 3 miles north-eastward of Bateman islet, and appears to have consisted formerly of one large island and several islets, which are now united by substantial stone walls stretching from point to pont; the entire area within the walls is cultivated with rice and cotton, and is well populated. A mud flat extends from all sides of Mei shan except the north-western, and three rocky islets lie on this flat eastward of the south point of the island. Damson islands, consisting of Ching lung and Pak shei, lie close off the east point of Mei shan. A rock, with a depth of 3 fathoms (5^{m}5), lies about 2 cables eastward of the south point of Ching lung. Combe rock, nearly 2 cables south-eastward of the south point of Pak shei, is a pinnacle with a depth of 3 feet (0^{m}9).

Junk channel, separating Mei shan from the mainland, has general depths of from 4 to 6 fathoms (7^{m}3 to 11^{m}0), except in the south-western part, where it shoals to 1½ fathoms (2^{m}7) and less; it is not used for navigation.

Sing lo san (*Lat. 29° 52′ N., Long. 122° 06′ E.*), lying close to the coast about 2½ miles south-westward of Ketau point, is a rocky islet with a sharp summit.

Futo channel.—Futo (Fa tu) channel, between the coast just described and the north-western side of Luhwang shan, is entered from southward by three channels, namely, Roberts, Gough, and Duffield passes. Gough pass, the central one of the three, is the best, as it free from dangers, and the shores on both sides are steep-to.

Roberts pass, the western channel, lies between the mud flat which extends south-westward from Mei shan and the Central islets; it is about 3 cables wide in its narrowest part and its fairway is deep. A mud bank, with depths of less than 3 fathoms (5^{m}5), extends about 4 cables south-westward from Latau san, the south-western of the Central islets; a rock, 26 feet (7^{m}9) high, lies on the north-western

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Chart 1429.

edge of this bank. A rock, which dries 4 feet (1m2), lies nearly one cable north-eastward of the north-eastern islet. Roberts pass is not recommended, as sounding gives no warning of approach to the mud bank forming the north-western side of the channel, and, when the mud is covered, the appearance of the pass is deceptive.

Gough pass, between the Central islets and Futo, is half a mile wide at the narrowest part and its fairway is deep. Futo has a range of hills on it covered with grass, with a well defined summit, 604 feet (184m1) high, near the northern end of the island; there are several villages, and the reclaimed land is well cultivated. St Andrew island, about 2 cables off the southern extremity of Futo and connected to it by a mud flat which dries, is rocky. Wen chau island lies about a quarter of a mile south-westward of St. Andrew island, with a deep passage between, and is covered with grass; a 3-fathom (5m5) patch lies about 1¼ cables southward of the island. The tidal streams are very rapid in the channel between Wen chau and St. Andrew islands. Chloe island lies about 3 cables northward of the north-east point of Futo, and Hebe island lies about a quarter of a mile north-eastward of the same point; a rock, which dries 5 feet (1m5), lies about one cable off the north-western side of Chloe island.

Duffield pass, between Futo and the west coast of Luhwang shan, is entered from the southward between St. Andrew island and Duffield rocks (page 236). A rock, 77 feet (23m5) high, lies about 4 cables north-north-eastward of the east point of St. Andrew island, with a 3-fathom (5m5) patch between; within a distance of 2 cables northward of the rock are two smaller rocks, 3 feet (0m9) and 30 feet (9m1) high, respectively. The west coast of Luhwang shan between Clarence point and Yutin point, about 4 miles northward, is fairly steep-to and the slopes of the hills are wooded. Tancred rock, 3 feet (0m9) high, lies about 1¼ miles northward of Clarence point and one cable offshore. The Notches are two rugged islets, the north-eastern of which lies about half a mile westward of Tancred rock, with a clear and deep channel between; a rock, which dries 8 feet (2m4), lies about 2 cables westward of the Notches, and the passage between these islets and Futo should not be used. Young Hebe rock, with a depth of 1¾ fathoms (3m2), lies on the western side of the channel and about 2 cables eastward of Hebe island; a 5-fathom (9m1) patch lies about 4 cables north-eastward of Hebe island. Bird rock (*Lat. 29° 46′ N., Long. 122° 04′ E.*), about 6 cables south-westward of Yutin point and one cable offshore, dries 10 feet (3m0); an islet, 24 feet (7m3) high, lies about a quarter of a mile southward of Bird rock.

Anchorage can be obtained off the north coast of Luhwang shan between Yutin point and Cape Luhwang, about 2¾ miles east-north-eastward, in a depth of about 13 fathoms (23m8), mud; anchorage can also be obtained, in moderate depths, off the coast of the mainland between the Damson islands and Ketau point. Fishing stakes were observed to extend, in 1934, for about a mile in a west-south-westerly direction from Cape Luhwang.

Tidal streams.—The tidal streams in Gough pass and Duffield pass run in a north-easterly direction from 2½ hours before until 3½ hours after high water, and in a south-westerly direction from 3½ hours after high water until 2½ hours before the next high water; the time of the turn of the stream is slightly advanced or retarded by the

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Chart 1429.

direction of the prevailing wind, and there is a period of slack water. The maximum rate is from 3 to 5 knots, according to the age of the moon.

Coast.—Off-lying island.—Ketau point is bold and steep-to; between this point and North Ketau point, nearly 2½ miles north-north-westward, the land rises abruptly in grass-covered ridges to Ketau peak, about midway between the two points. The promontory, of which Ketau point is the eastern extremity, is mountainous, the highest peak being Mount Union, situated nearly 20 miles westward of Ketau point; Mount Warn is situated about 10½ miles westward of Ketau point. The country is well populated and cultivated, the plains being covered with rice and cotton fields, and the valleys terraced with small plantations, in places to an elevation of 800 feet (243m8); there are many patches of cultivation on the summits of the highest mountains.

Roundabout island, about one mile north-eastward of Ketau point, is steep, rocky, and has a round summit covered with grass; a rock, 2 feet (0m6) high, lies about half a cable off the south point of the island and is connected to it by a drying ridge. The channel between Roundabout island and the coast westward is deep, and it can be navigated by vessels, but there are heavy tide rips and strong eddies; it should not be used by vessels unable to maintain a speed of 10 knots when there is a spring tidal stream against them.

Tidal streams.—The rate of the tidal streams near Roundabout island varies from 2 to 6 knots, and there are whirls and eddies caused by the meeting of the various streams, the water never being at rest. As a rule the tidal streams northward of the island run north-westward from 3 hours before until 2 hours after high water, and south-eastward from 2 hours after high water until 3 hours before the next high water.

Tai shei shan and adjacent islands.—Tai shei shan lies close off the coast of the mainland with its south-eastern extremity about 6½ miles westward of North Ketau point. The greater portion of the island is hilly, rising to a double peak 1,079 and 1,089 feet (328m9 and 331m9) high, but there are some plains cultivated with rice and protected by reclamation walls; there are numerous villages on the island. The indentations in the coasts of the island are mostly filled by mud flats, which are steep-to except on the western side, where a flat extends as much as three-quarters of a mile to a depth of 3 fathoms (5m5).

Several islands lie off the south-eastern part of Tai shei shan. Bug gei, the easternmost of these, lies about 4½ miles westward of North Ketau point, and is a rocky islet covered with grass and bushes; a rock, awash at high water, lies about 2 cables south-westward of this islet. Da mo, about 4 cables north-westward of Bug gei, has a well defined summit 192 feet (55m5) high. Cheun pi, between Da mo and the east coast of Tai shei shan, is cultivated in patches up to its summit. Na sing mei, Li sing mei, Spit island, and Red island are four islands in Tai shei shan pass, which separates Tai shei shan from the coast southward; this pass is very narrow in places, and is obstructed by shoals and fishing nets.

Yu en su (*Lat. 29° 57′ N., Long. 121° 58′ E.*), an islet 22 feet (6m7) high, lies close off Insular point, the northern extremity of Tai shei shan. An islet, 63 feet (19m2) high, lies about 1½ miles south-eastward of Yu en su and about 2 cables offshore.

Charts 1199, 2412, 1262.

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Chart 1429.

Tai shei shan harbour.—Lights.—Tai shei shan harbour, between Tai shei shan and the mainland south-westward, is sheltered from all directions. The entrance, between the flat extending from the west coast of Tai shei shan and that extending from the mainland coast, is about 3 cables wide, with depths of from 4 to 6 fathoms (7m3 to 11m0); within the entrance the depths increase to as much as 15 fathoms (27m4). The south-eastern limit of the harbour is abreast a rock off the mainland and about 7 cables north-westward of the south point of Tai shei shan; this rock dries 7 feet (2m1), and has an iron tripod on it, from which a light, privately maintained, is exhibited.

A light, privately maintained, is exhibited from a tower, 40 feet (12m2) in height, on the western extremity of Tai shei shan; a light, privately maintained, is also exhibited from an iron tripod on a concrete base on the mud flat on the eastern side of the entrance.

In fine weather open anchorage can be obtained, in depths of from 7 to 12 fathoms (12m8 to 21m9), mud, northward of the bar at the entrance to the harbour; it is sometimes convenient to wait here for daylight to approach the Yung river (page 271). Good anchorage can be obtained inside the harbour, in depths of from 8 to 15 fathoms (14m6 to 27m4); it is necessary to moor to keep the anchors clear.

The tidal streams run north-north-westward from 4 hours before until 2 hours after high water, and south-south-eastward from 2 hours after high water until 4 hours before the next high water.

Directions.—Vessels making for Tai shei shan harbour from the eastward should keep Yu en su open northward of the northern side of Tai shei shan until Huangniu chiao (page 262) bears 338°, distant about 1¼ miles. The harbour can then be entered with the 1,560-foot (475m5) high summit about half a mile north-eastward of Mount Warn in line with a hill, 368 feet (112m2) high, at the head of the harbour, bearing about 155°; this mark, which must be followed closely, leads over the bar in a least depth of 5 fathoms (9m1). When abreast the village on the west point of Tai shei shan a mid-channel course can be steered to a convenient anchorage.

Tower hill channel.—Tower Hill channel is situated between the coast of the mainland westward of North Ketau point, and the islands Bug gei, Da mo, Cheun pi, and Tai shei shan on the south, and the islands Ao san, Tsen yo san, Jau and Ta mau, all lying off the western part of the south coast of Chu san (*see* pages 266—268), on the north.

Tower hill channel is free from dangers, and is deep throughout. There are, however, heavy tide rips, and the rate of the tidal streams varies from 3 to 7 knots, according to the age of the moon; it is advisable to keep in mid-channel. Off Ta Mau the tidal streams run north-westward from 3 hours before until 3 hours after high water, and south-eastward from 3 hours after until 3 hours before the next high water.

Tinghai and its approaches are described on pages 266—271.

Blackwall channel.—Islets and danger.—Blackwall channel, between the southern part of the west coast of Chu san and Chintang (Kin tang), is a continuation northward of Tower hill channel. The west coast of Chu san, which forms the eastern side of the channel, is fringed by a broad mud flat for about 4 miles north-north-westward of Yang loi point (page 269); a rock, 33 feet (10m1) high,

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Chart 1429.

lies on the edge of this flat and about 2½ miles north-north-westward of Yang loi point. Wateo is a hilly islet lying about 4½ miles north-westward of Yang loi point and 4 cables offshore; a shoal, with depths of less than 3 fathoms (5m5), extends about half a mile south-eastward from Wateo, and a mud flat extends about 4 cables from the western side of the island. A rock, 8 feet (2m4) high, lies about 3 cables southward of this island.

The south-east and east coasts of Chintang are fairly steep-to, and a ridge of hills rises close within; Saddle hill, about one mile west-north-westward of Algerine point, the south-eastern extremity of the island, and Hsienjen shan (Kintang peak), about 1½ miles northward of saddle hill, are conspicuous. A rocky spit extends about 2 cables south-eastward from Algerine point, and terminates in a rock which dries one foot (0m3). The west coast of Chingtang is described on page 265.

Steward islet, black, rugged, and steep-to, lies in the middle of Blackwall channel and about 2 miles north-eastward of Algerine point (*Lat. 30° 00′ N., Long. 121° 55′ E.*); a rock, with a depth of 2¼ fathoms (4m1) over it, lies about 3 cables north-eastward of Steward islet. Owing to the strong tidal streams, which attain a rate of from 3 to 8 knots, it is advisable to keep in mid-channel between Steward islet and Chintang.

Anchorages.—There is anchorage in moderate depths, and out of the strong tidal streams, anywhere within one mile of the flat extending from the Chu san coast between Yang loi point and Wateo.

Tolerably good anchorage, comparatively free from the strong tidal streams, can be obtained off the south coast of Blackwall island, at the northern end of Blackwall channel, in depths of from 9 to 15 fathoms (16m5 to 27m4), with the 924-foot (281m6) peak in the northern part of Chintang in line with Rondo, an islet about 2 cables off the south-west point of Blackwall island, bearing 274°; it is necessary to moor to avoid fouling the anchor.

There is also anchorage off the east coast of Chintang, north-eastward of Hsienjen shan, in depths of from 8 to 10 fathoms (14m6 to 18m3) This anchorage is somewhat protected from the tidal streams by the rocky north-east point of Chintang; vessels must moor with the anchors parallel to the coast, and the west point of Blackwall island must not be open eastward of the above rocky point.

Ketsu pass and Hsihou men.—Dangers.—Light.—Ketsu pass lies between the northern part of the west coast of Chu san and Blackwall island; on the eastern side of the pass are the four islands Wateo (which has been described with Blackwall channel), Lin, Latea, and Ketsu. An islet 48 feet (14m6) high, lies about 2 cables westward of the south point of Ketsu, and a shoal, with a depth of 3 fathoms (5m5) extends about one cable westward from this islet. Ketsu pass is a good ship channel, about 3 cables wide in its narrowest part, between the west point of Ketsu and the east coast of Blackwall island, and it is free from violent overfalls; Maum shan, on the eastern side of the northern entrance to Ketsu pass, and the Dunsterville islets, have been described on page 249.

Hsihou men (Blackwall pass), between the south-west coast of Blackwall island and the northern end of Chintang, has general depths of over 20 fathoms (36m6), but the bottom is rocky and very

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Chart 1429.

uneven. A 7-fathom (12m8) patch lies about 6 cables southward of Rondo, an islet off the south-west point of Blackwall island, and a 6-fathom (11m0) patch lies about three-quarters of a mile west-northwestward of that islet; there are also two 9-fathom (16m5) patches in this vicinity. A rock, 17 feet (5m2) high, lies nearly one mile northward of Rondo. Wanchan shan (Goulin rock), with a depth of 6 feet (1m8), lies about 3 cables south-eastward of the north-east point of Chintang. A rock, which dries 11 feet (3m4), lies about half a cable southward of the west point of Blackwall island, and the tidal streams are very rapid around it. A mud bank, with depths of less than 3 fathoms (5m5), extends about three-quarters of a mile northwestward from Blackwall island.

The north-east coast of Chintang, forming the western side of Hsihou men, is indented by three bays, all filled with mud flats. Hengtang shan (Leang), an island about a quarter of a mile off the north point of Chintang, is steep-to on its eastern side; Wulung shan (Chocho) lies about one mile west-north-westward of Hengtang shan, and is almost connected to it by a bank with depths of less than 3 fathoms (5m5). Tsaihua shan (Fangshi), about a quarter of a mile northward of Wulung shan, has a sharp summit; a mud bank, with a depth of 2 fathoms (3m7) on its outer part, extends about half a mile northwestward from the island. An islet, 60 feet (18m3) high, lies about 2 cables eastward of the northern part of Tsaihua shan (chart 1199). A light, privately maintained, is exhibited, at an elevation of 120 feet (36m6), from a tower over a dwelling, 20 feet (6m1) in height, on the north-eastern side of Tsaihua shan.

Tidal streams.—In Hsihou men the tidal streams run in a northwesterly direction from 4 hours before until 2 hours after high water, and in a south-easterly direction from 2 hours after high water until 4 hours before the next high water; there is scarcely any slack water at spring tides. The rate varies from 3 to 8 knots, according to the time of the tide and the age of the moon. A continuance of heavy rain, causing a freshet in the Tsien tang kiang (page 277), checks the stream setting north-westward and considerably accelerates that setting south-eastward.

The tidal streams whirl and race violently over the shoaler places, and with northerly gales there are high overfalls when the stream is setting south-eastward. In north-westerly gales there is a very severe overfall over the shoal spots westward of Rondo (*Lat. 30° 04′ N., Long. 121° 55′ E.*) when the stream is setting north-westward.

Chintang channel.—Islets and dangers.—Chintang channel is situated between Tai shei shan (page 261) and the coast of the mainland westward of it on the south, and Chintang on the north. The southern side of the channel, between the western entrance point of Tai shei shan harbour and Suanshantou (Ko point), nearly 8 miles west-north-westward, is fronted by an extensive mud bank which dries out fully one mile in places. Two conspicuous rocks, 8 feet (14m6) and 52 feet (15m8) high, lie on the edge of this mud bank about 1¼ and 2 miles, respectively, westward of the entrance to Tai shei shan harbour. Sanshan (Sam san) islets lie on the mud bank about midway between the entrance to Tai shei shan harbour and Suanshantou; a creek through the mud along the western side of these islets leads to the town of Sin chi tau.

Charts 1124, 1199, 2412, 1262.

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Chart 1429.

Huangniu chiao (Just in the way), about 2 miles eastward of Oyu chiao (Alligator point), the south point of Chintang, and nearly in mid-channel, is a black, rugged rock 16 feet (4m9) high; a rock, which dries 2 feet (0m6), lies close southward of it.

Shuang chien (Alligator reef), about 1½ cables southward of Oyu chiao, is awash at high water and is marked by a red stone beacon. A 9-fathom (16m5) patch lies about 1¼ miles west-south-westward of Oyu chiao, and there are heavy tide-rips in its vicinity at spring tides.

Several islets and rocks lie on the southern side of the western entrance to Chintang channel. Huangmang shan (Wang mei san), the largest of these islets, lies about half a mile north-eastward of Suanshantou, and being covered with grass, is of a light colour; a bank, with two rocks on its north-eastern edge, extends about 2 cables eastward from this islet. A shoal, with three rocky islets on its outer edge, extends nearly a quarter of a mile north-westward from Huangmang shan. O chiao (Blonde rock), about 4 cables north-north-westward of the north point of Huangmang shan, dries 6 feet (1m8) and is marked by a black beacon surmounted by a daymark; this beacon was not observed in 1935. Chungmenchu (Ka mun) is an islet about a quarter of a mile northward of Suanshantou, with foul ground between; Ko men, between this islet and Huangmang shan, is a deep and clear passage, except for an 8-fathom (14m6) patch lying about 1½ cables northward of Chungmenchu.

Paike shan is a small rocky promontory about one mile westward of Shuanshantou, the bay between being filled with a mud flat; a rock, with a depth of less than 6 feet (1m8) over it, lies about 2 cables north-north-westward of Paike shan. Changtiao (Chang tu) point, about half a mile westward of Paike shan, is a black, rocky promontory rising to an elevation of 113 feet (34m4); about midway between these two points is a rock 11 feet (3m4) high, and between this rock and Changtiao point are two rocks close together, which dry 7 feet (2m1).

The Yung river is described on page 271.

Islands off the northern end of Chintang.—Light.—Taiping shan (Ta ping) is a hilly island lying close off the north-western extremity of Chintang. A light is exhibited, at an elevation of 280 feet (85m3), from a white tower over a white building, 30 feet (9m1) in height, situated on a hill on the north-western extremity of Taiping shan.

Taochu shan (Ta utze island) lies on the outer end of a spit, with with depths of less than 3 fathoms (5m5), which extends nearly 1¼ miles southward from Taiping shan. Kanyu (Tap islet) lies about 2 cables northward of the north-west point of Taiping shan; a spit, with depths of less than 3 fathoms (5m5), extends about half a mile northward from this islet.

Tatiaokuo (Shuntin) lies nearly one mile north-eastward of Kanyu (*Lat. 30° 05′ N., Long. 121° 49′ E.*). Hsiaotiaokuo lies about a quarter of a mile eastward of Tatiaokuo and is almost connected to Wulung shan; the latter island, with Hengtang shan and Tsaihua shan, has been described with Hsihou men on page 264.

Taochu harbour.—Taochu (Ta utze) harbour is formed by the narrow channel separating Taochu shan and Taiping shan from the coast of Chintang, and is available as an anchorage for small vessels

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Chart 1429.

with local knowledge in a typhoon. There are depths of from 3¼ to 5¾ fathoms (5^{m}9 to 10^{m}5) in mid-channel in the southern part of the harbour, as far northward as the east point of Taiping shan, where the channel is obstructed by a ridge of rocks; the northern entrance to the harbour is shoal.

There is room for several vessels not drawing more than 16 feet (4^{m}9), but it is necessary to moor; the tidal streams attain a rate of 3 knots, and at spring tides there are numerous eddies in the harbour, when the surging of a vessel at her moorings somewhat strains the cables.

Charts 1395, 1429.

TINGHAI AND APPROACHES.—Tinghai harbour, off the south coast of Chu san, can be reached by various channels between the numerous islands lying off this coast. The safest and best route, which is recommended for large vessels, is through Tower Hill channel (page 262), through Haji ko, the channel between Si ha ji and Bun ji, and thence through North Bun ji channel, as shown by the pecked line on chart 1395.

Melville channel, entered from the southward between Tsen yo san and Hang fu san, is a direct route to Tinghai harbour for vessels approaching from the southward, but it is not recommended for large vessels, or vessels of low power, as there are several dangers in the northern part, with narrow passages between, and the rapid tidal streams form eddies that at times render a vessel unmanageable.

Sinkea channel is an inshore passage along the south coast of Chu san for small vessels not exceeding 10 feet (3^{m}0) in draught, proceeding between Sinkeamun (page 247) and Tinghai. A stone beacon stands on Lao tio, a rock which dries 6 feet (1^{m}8), situated in the western entrance of this passage. Local knowledge is essential for the navigation of this narrow passage, in which are some rocks which dry, and no further description of it will be given.

Islands eastward of Melville channel.—Ao san lies with its southern extremity nearly 3 miles north-eastward of North Ketau point (*Lat. 29° 55′ N.; Long. 122° 07′ E.*), and has a noticeable peak, 412 feet (125^{m}6) high, in its south-western part. A spit, with depths of less than 3 fathoms (5^{m}5), extends nearly one mile eastward from the south-eastern side of the island. The south point of the island is steep-to, but the south-western side of the island is fringed by a bank which dries; three rocks, 72, 8 and 12 feet (21^{m}9, 2^{m}4, and 3^{m}7) high, respectively, lie within a distance of 3 cables southward of the south-west point. Kun hi, a rock 63 feet (19^{m}2) high, lies about 6 cables westward of the south-west point of Ao san; it is deep within half a cable of the eastern side of this rock, but there are depths of less than 5 fathoms (9^{m}1) for a quarter of a mile westward of it.

Jan ji lies about 4 cables northward of Ao san, and a mud flat, on which are Mun du san and two other islets, extends about 2½ miles south-eastward from it. Several rocky islets lie off the north-western side of Jan ji.

Sung san lies about 2 cables north-westward of Ao san. Sung san tio, about one cable southward of the south-west point of Sung san is a rocky ledge, which dries 6 feet (1^{m}8), with a stone beacon on it; another rocky ledge, which dries 4 feet (1^{m}2), lies close southward

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Charts 1395, 1429.

of Sung san tio. Ko san, about 2 cables northward of Sung san, is covered with small fir trees; a drying ledge, with a rock above water on its outer end, extends about one cable southward from Ko san. Fang wo san lies about 2 cables northward of Ko san, and there is a rock 3 feet (0m9) high, and a rock which dries 3 feet (0m9), between these two islets. The channel between these islands and the eastern side of Sio ju is deep in the fairway, but it is barely one cable wide in places, and the tidal streams attain a rate of from 3 to 5 knots; it should not be used for navigation.

Chart 1395.

Melville channel.—Dangers.—Hang fu san, on the eastern side of the southern entrance to Melville channel, lies about one mile westward of the south-west point of Ao san, and has a hill, 130 feet (39m6) high, at its northern end. Tsen yo san, on the western side of the entrance and about 1½ miles westward of Hang fu san, has a rocky, precipitous hill, 700 feet (213m4) high, on its southern part; the highest part of the island, 865 feet (263m6) high, is in about the middle. A flat extends from the eastern side of Tsen yo san, completely filling the bight northward of Trunk point, the eastern extremity of the island.

Sio dun chi, about 4 cables north-eastward of the north-east point of Tsen yo san, is an islet on the western side of the fairway. To dun chi san lies with its southern extremity about 3 cables north-westward of Sio dun chi; Harry peak, the summit of the island, is a conical hill. Duck rocks lie about one cable south-westward of To dun chi san and are about one foot (0m3) high. Ling ju san lies close off the northern end of To dun chi san. To king san lies nearly 2 cables north-eastward of the northern extremity of To dun chi san. The Ledge, a reef which dries 2 feet (0m6) at its outer end, extends about one cable eastward from the east point of To king san, and the tidal streams set rapidly across it as soon as it is covered. A reef extends about three-quarters of a cable northward from the northern end of the island, and on the outer end of this reef is Cap, a rock 16 feet (4m9) high. Black rock, about 1½ cables north-eastward of To king san, lies on the middle of a reef and is 2 feet (0m6) high. All these islands and reefs are on the western side of Melville channel.

Sio ju or Deer island lies with Deer point, its south-western extremity, about 6 cables eastward of Sio dun chi; in the middle of the island are three rounded summits, the northernmost and highest being 670 feet (204m2) high. Mu san and another islet, 27 feet (8m2) high, lie on a mud flat close off the southern side of Sio ju and almost connected to Deer point. Stone walls are built between the points of the bays around Sio ju, and the land reclaimed within them is cultivated.

Sarah island (*Lat. 29° 59′ N., Long. 122° 06′ E.*) and To ju lie together on a mud flat which is separated from the north-western side of Sio ju by Deer island channel, which is a branch of Melville channel. Elliot patch, with a least depth of 3½ fathoms (5m9), lies in the middle of the narrowest part of this channel, between To ju and the north-west point of Sio ju. Tsing tio, about a quarter of a mile north-eastward of To ju, is a small rock which dries one foot (0m3), and on it is a stone beacon about 6 feet (1m8) high; a 1½ fathom (2m7) patch lies about one cable east-north-eastward of this rock.

Charts 1199, 2412, 1262.

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Chart 1395.

Melville rock, with a least depth of 1½ fathoms (2m7), lies on the eastern side of the main route through Melville channel and nearly 3 cables eastward of the east point of To king san. Dundas rock, also on the eastern side of this channel, lies about 2 cables northward of Melville rock and has a least depth of one fathom (1m8) over it.

Tidal streams.—The tidal streams between Sio ju and To dun chi san run northward from 3 hours before until 2½ hours after high water, and southward from 2½ hours after high water until 3 hours before the next high water, both streams attaining a rate of from 3 to 5 knots.

Between To king san and Sarah island the tidal streams swirl around Melville and Dundas rocks, and attain a rate of from 3 to 5 knots; this channel is more difficult to navigate than Deer island channel, although the tidal streams are also strong in the latter.

Islands and dangers between Melville channel and Haji ko.—Sio tsen ya, separated from the northern side of Tsen yo san by a channel about one cable wide, has a hill on its southern part 223 feet (68m0) high. Rip rock lies about 1¼ cables north-eastward of the north point of Sio tsen ya and is awash. Kao san and Pe san are two islets lying together on a reef; the south point of Kao san lies about 1¼ cables northward of the north point of Sio tsen ya. Fury rock, with a depth of 1¾ fathoms (3m2), lies about 2¼ cables west-south-westward of Kao san, and there are irregular depths of from 4¼ to 10 fathoms (8m2 to 18m3) between.

To tzu san lies with its southern extremity about 2 cables westward of the north-west point of Tsen yo san. Hecla rocks, which dry 10 feet (3m0), lie off the middle of the east coast of To tzu san and are connected to it by shoal water.

Lio mang, Sio mau, and Jau are three islands lying south-westward of To tzu san and between Tsen yo san and Ta mau.

Bun ji or Tea island lies with its southern extremity about 6 cables northward of To tzu san; a range of hills, rising to an elevation of 520 feet (158m5) in the northern part, runs through the island from northward to southward. There are paddy fields along the eastern side of the island, and salt-pans on the mud where it only covers at high water spring tides.

Sio bun ji is the largest of five islands lying off the south-east coast of Bun ji, with a narrow channel, available for boats, between. South Bun ji channel is situated between these islands on its north-western side, and To tzu san and the chain of islands which extend north-eastward to Sarah island on its south-eastern side. This channel should not be used, as Davy rock, with a depth of 1¾ fathoms (2m7), lies in the middle of the south-western entrance and about 2 cables northward of the north-west point of To tzu san, whilst the channel is narrowed to a width of about half a cable between the south-east point of Sio bun ji and Cap; Eddy rock, with a depth of one fathom (1m8) over it, lies off the south point of Sio bun ji. The tidal streams in this channel attain a rate of from 3 to 5 knots.

Western approach to Tinghai harbour.—Ta mau, on the south-eastern side of the western approach to Tinghai harbour, rises to its highest peak in Tower hill (*Lat. 29° 57′ N., Long. 122° 02′ E.*), situated in about the middle of the island. A bank extends from the

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Chart 1395.

north-western side of the island, and there are depths of less than 5 fathoms (9m1) for about 3 cables outside the line joining Long ka point, the north point of the island, and the north-west point.

Haji ko is a clear and deep channel between the western side of Bun ji and Si ha ji, an island about three-quarters of a mile westward. Ta wan ja pan lies on the eastern side of this channel and about one cable westward of the southern extremity of Bun ji; a rock, with a depth of less than 6 feet (1m8), lies about 1¼ cables south-south-eastward of the south point of Ta wan ja pan, and a bank, with depths of from 5¾ to 8 fathoms (10m5 to 14m6), extends about 2 cables south-westward from the rock. There is good anchorage between Bun ji and Si ha ji, in depths of from 11 to 12 fathoms (20m1 to 21m9), mud, towards the Bun ji side of the channel, where the tidal streams are not so strong and run more regularly. In 1932 H.M.S. *Cornwall* anchored 7¼ cables 121° and 5¼ cables 072°, respectively, from Kwo wu tio beacon (*see* below); in the former position the holding ground, stiff mud and shells, was good, but both anchorages were uncomfortable and the tidal streams were strong.

North Bun ji channel lies between Bun ji and the south coast of Chu san. Nab rock, with a depth of 1¾ fathoms (3m2), lies about 2 cables off the Chu san coast and about 4½ cables off Tiang tio chu point, the north point of Bun ji; a rock, with a depth of 1¼ fathoms (2m3), lies about half a mile north-north-eastward of the same point and about one cable off the Chu san coast. Sio chu san, about half a mile east-north-eastward of Tiang tio chu point, is almost connected to the coast of Chu san; there is a fort on the point northward of the island, and there are two forts on the coast northward of Nab rock. Anchorage can be obtained between Nab rock and Sio chu san, in depths of from 16 to 17 fathoms (29m3 to 31m1), but it is not recommended, as the tidal streams and eddies are strong. For directions, *see* page 270.

Tidal streams.—Between Ta mau and Si ha ji the tidal streams set westward from about 3 hours before until 2½ hours after high water, and eastward from 2½ hours after high water until 3 hours before the next high water; the maximum rate is from 2 to 3 knots.

North-eastward of Bun ji the tidal streams set north-westward from about 3 hours before until 2½ hours after high water, and south-eastward from about 2½ hours after high water until 3 hours before the next high water; the maximum rate of both streams is from 2 to 3 knots.

South coast of Chu san.—Yang lo i san, lying about 2 cables southward of Yang loi point, the south-west point of Chu san, is a rocky island covered with grass. Ching du san lies about 6 cables eastward of Yang loi point and 1½ cables offshore; O ki san lies about one cable north-eastward of Ching du san. Lo i dur mang, the channel between these two islands and Si ha ji, should not be used by vessels without local knowledge, as the swirl of the tidal streams may set a vessel on to the rocks in the channel. A narrow shoal, with a least depth of one fathom (1m8) extends about one cable in a northerly direction from a position about one cable northward of the north point of Si ha ji. Kwo wu tio is a rocky patch lying about 3 cables northward of the north point of Si ha ji, and it is marked by a stone beacon. The local steam vessels always use Lo i dur mang, passing fairly close to the south-east point of Ching du san, and thence northward of Kwo wu tio and through North Bun ji channel.

Charts 1429, 1199, 2412, 1262.

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Chart 1395.

In the Lo i dur mang the tidal streams set south-westward from about 3 hours before until 2½ hours after high water, and north-eastward from 2½ hours after high water until 3 hours before the next high water; the rate of both streams is from 2 to 5 knots.

Lao ki point (*Lat. 30° 00′ N., Long. 120° 03′ E.*) is situated about 4½ cables north-eastward of O ki san. A dan san, nearly 3 cables north-north-eastward of Lao ki point and about one cable offshore, is an islet surrounded by a reef.

Tinghai harbour.—Sio wu kwe san lies with its west point nearly 7 cables south-eastward of Sio chu san. Wu kwe san, a wooded island, lies north-eastward of Sio wu kwe san and is separated from it by Ko lo man, a narrow channel with depths of from 4 to 7 fathoms (7m3 to 12m8) in the fairway. A bank, with depths of less than 3 fathoms (5m5), extends about 2½ cables eastward and 3½ cables south-eastward from Wu kwe san; Grave islet, 40 feet (12m2) high, lies on the north-eastern part of this bank. There is a least depth of 3¾ fathoms (6m9) between this bank and the Chu san coast eastward, and this channel is the eastern entrance to Tinghai harbour.

Middle ground, with a least depth of 1½ feet (0m4), lies in the western entrance to Tinghai harbour. There is a deep channel, about one cable wide, between Middle ground and Sio chu san; the channel eastward of Middle ground, between it and Sio wu kwe san and Wu kwe san, is about 1¼ cables wide, with depths of over 5 fathoms (9m1).

Tinghai harbour, northward of Wu kwe san and eastward of Middle ground, has general depths of from 3 to 8 fathoms (5m5 to 14m6). There are several shoals, with depths of from 1¾ to 2¼ fathoms (2m3 to 4m1), in the eastern part of the harbour. Parry rock, which dries 4 feet (1m2), lies about 1¾ cables northward of Grave islet, and is marked by a stone beacon about 2 feet (0m6) high; there is a deep channel, about half a cable wide, between this rock and the coast of Chu san.

Anchorages.—The outer anchorage, for large vessels, is northward of Tsing tio (page 267), in a depth of about 12 fathoms (21m9), with Cap in line with the north-western side of Sarah island, bearing 228°, and Grave islet bearing 332°; in this position the tidal streams are fairly steady in direction, and there are but few eddies. South-eastward of Sio wu kwe san the bottom is very uneven, and there are heavy swirls and eddies.

The best anchorage in Tinghai harbour is south-westward of Joss hill, situated on the coast of Chu san north-north-westward of Parry rock, in a depth of 6 fathoms (11m0), mud, with Grave islet bearing 130°, and the west point of Sio wu kwe san bearing about 214° and just open north-westward of the north-west point of Wu kwe san; this anchorage is occasionally encumbered by junks, although they usually anchor between Middle ground and Chu san. The tidal streams and eddies are very strong, and it is therefore, necessary to moor. There is a floating pontoon landing place at the eastern end of the town.

Charts 1395, 1429.

Directions.—Vessels using the western approach to Tinghai harbour should keep in mid-channel through Tower hill channel and pass about 6 cables north-westward of Ta mau, thence following the track indicated by a pecked line on chart 1395.

Charts 1199, 2412, 1262.

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Charts 1395, 1429.

If proceeding to the inner anchorage vessels can pass south-eastward of Middle ground by keeping Tower hill, on Ta mau, bearing about 222° astern and showing over the southern slope of the hills on Bun ji; when using this channel vessels should pass about one cable north-westward of Sio wu kwe san and Wu kwe san, but when the tidal stream is setting in a south-easterly direction they must guard against being set on to the western extremity of Sio wu kwe san.

To enter Tinghai harbour by the eastern entrance a north-north-westerly course should be steered from the outer anchorage, so as to pass about one cable eastward of Grave islet (*Lat. 30° 00′ N., Long. 122° 06′ E.*), taking care to avoid the bank extending south-eastward from Wu kwe san; thence steer a mid-channel course between Parry rock and the coast of Chu san, and then alter course westward for the anchorage.

If using Melville channel it is preferable to enter with the north-going stream. From abreast Roundabout island (page 261) a north-westerly course may be steered for the entrance of the channel; thence pass fairly close eastward of Sio dun chi, and bring Trunk point in line with the eastern side of this islet, bearing 184° astern, which leads between The Ledge and Melville rocks, and between Black rock and Dundas rock. When past Sarah island the outer or inner anchorage can be steered for as previously directed.

If using Deer island channel vessels should keep towards the Sio ju side of the channel so as to avoid Melville rock and the mud flat extending south-eastward from Sarah island. There is no leading mark for clearing Elliot patch; the channel south-eastward of it is wider and deeper than that north-westward. Tsing tio may be passed on either side, bearing in mind that a 1½-fathom (2^{m}7) patch lies about one cable east-north-eastward of this rock.

Chart 1395.

Tinghai.—The city of Tinghai is surrounded by a wall 24 feet (7^{m}3) high and 13 feet (4^{m}0) wide, surmounted by a parapet 4 feet (1^{m}2) high and 2 feet (0^{m}6) wide. A canal about 33 feet (10^{m}1) wide, with depths of from 3 to 5 feet (0^{m}9 to 1^{m}5), almost encircles the city and enters it near the southern gate, which is about half a mile from the shore of the harbour; the principal gate is at the south-western corner. Canals form the principal means of transport in this neighbourhood. An embankment, 20 feet (6^{m}1) high, prevents the encroachment of the sea on the rice fields within the coast.

Chart 1592.

YUNG RIVER.—The Yung river, which rises in the high ranges of the province of Chekiang, flows into the sea about 2 miles westward of Changtiao point. At the city of Ningpo, situated about 12 miles above the mouth, the river divides into two branches; the north-western of these, known as the Yuyao branch, leads to the town of Yuyao, situated about 15 miles north-westward of Ningpo; the southern or Fenghwa (Fungwha) branch is barely one cable wide. Chinhai, the port of Ningpo, is situated on the western side of the mouth of the river.

The least depth in the fairway of the river up to Ningpo, in 1928, was 9 feet (2^{m}7). Strong winds between north and north-east usually raise the water level in the river about 1½ feet (0^{m}5) above normal;

Charts 1199, 2412, 1262.

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Chart 1592.

strong winds between north and north-west considerably retard the outflow of the ebb tide and cause irregularity in the normal times of low water. In the winter, from December to March, the water level is usually about 1½ feet (0m5) lower than in the summer months of August and September. In 1935 vessels with a draught of 19½ feet (5m9) could proceed to Ningpo; vessels not exceeding 10 feet (3m0) in draught could enter the river at any state of the tide. There is no berth at Ningpo for vessels exceeding 320 feet (97m5) in length.

Pilots.—There are licensed pilots for the Yung river; previous arrangements should be made by telegraph to the harbour master. The pilot usually meets a vessel in the vicinity of Nemesis rock; the pilot's sampan flies the usual white and red horizontal pilot flag. Pilotage is compulsory for merchant vessels drawing over 10 feet (3m0), except coastal steamers.

Island and dangers in approach.—Lights, buoy, and beacons.—Chili (Tse le), about 1½ miles northward of Changtiao point, is a bold, rocky island of a dark colour, and is precipitous on its northern side. The depths around the island are very irregular; there are depths of over 10 fathoms (18m3) at a distance of about one cable eastward and half a cable southward of the island; a short distance farther southward and south-eastward the depths decrease to from 3½ to 4½ fathoms (5m9 to 8m2), and increase again to over 10 fathoms (18m3) about three-quarters of a mile from the coast of the mainland. The depths westward of Chili are considerably less than those eastward, and a bank, with depths of less than 3 fathoms (5m5), extends in a north-westerly direction from a position about 2 cables westward of the island.

A light is exhibited, at an elevation of 123 feet (37m5), from a white octagonal tower, 33 feet (10m1) in height, situated on the north-eastern end of Chili. A fog signal is sounded from the lighthouse.

Tayu shan lies with its eastern extremity about three-quarters of a mile west-north-westward of Changtiao point (*Lat. 29° 58′ N., Long. 121° 46′ E.*); a mud bank, which dries, extends about 3 cables westward from this island, and Hsiaoyu shan (Siau yu) lies on its south-western part. Both these islands are cliffy, with rocky coasts, and are of a light colour, being covered with grass. Tayu shan is divided into two nearly equal parts; the east point of the southern part is a long rocky ledge, partly awash at high water. Nemesis rock, about one cable north-eastward of this point, dries 2 feet (0m6), and is marked by a red spar beacon surmounted by a day mark. A least depth of 2½ fathoms (4m1) can be carried through the channel between Nemesis rock and the bank which extends from the coast of the mainland south-eastward.

Sesostris rock, about 2 cables south-south-westward of the south-west point of Hsiaoyu shan, is a pinnacle with a depth of 1½ fathoms (2m3); a black and red chequered buoy, surmounted by a black daymark, is moored close northward of the rock. There is a least depth of 3½ fathoms (6m4) between Sesostris rock and Hsiaoyu shan; the passage southward of the rock is shoal and is not used.

Futsun shan (Fu san), about half a mile south-westward of the south-west point of Hsiaoyu shan, is a precipitous, rocky islet, dark and rugged. There is a landing place, in fine weather, on the southern side of the island, where some steep steps lead up to the lighthouse;

Charts 1429, 1199, 2412, 1262.

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Chart 1592.

with south-westerly winds landing can be effected in a crack between the rocks on the northern side. There are depths of from 2 to 2¾ fathoms (3m7 to 5m0) in the channel between Futsun shan and Sesostris rock. Tiger's tail consists of three rocks which dry; the outermost, which dries 5 feet (1m5), is marked by a black iron beacon surmounted by a white daymark, and lies about 1¼ cables north-westward of Futsun shan.

A light is exhibited, at an elevation of 148 feet (45m1), from an octagonal tower, 30 feet (9m1) in height, painted red and white in vertical stripes, on the summit of Futsun shan; the keepers' dwellings are also painted red and white in vertical stripes. A fog signal is sounded from the lighthouse.

Anchorage.—There is good anchorage, for vessels awaiting the tide or unable to cross the bar, southward of Tayu shan, in a depth of about 8 fathoms (14m6), with Chili lighthouse in line with the east point of Tayu shan, bearing 019°, and Futsun shan lighthouse bearing 258°. From this position communication with Chinhai is easy.

Tidal streams.—The tidal streams set north-westward past Chili and Changtiao point from 4 hours before until 2 hours after high water, and south-eastward from 2 hours after high water until 4 hours before the next high water; these times, however, are only approximate, as the duration of the streams is variable. The rate is from 2 to 6 knots, according to the age of the moon and the time of the tide.

The in-going stream of the river commences 4 hours before high water, and the out-going stream 1½ hours after high water; the rate is from one to 3 knots, according to the age of the moon and the time of the tide. After heavy rain inland the out-going stream often runs for about 12 hours, and vessels do not swing to the in-going stream at all, but this does not appreciably affect the time of high water.

Entrance to the Yung river.—The land on the eastern side of the entrance consists of extensive flat areas interspersed with hilly ridges; one of these ridges extends for nearly 2½ miles in a south-south-westerly direction from Changtiao point, and a lower ridge extends for about one mile in the same direction from Chinchi shan (Kin ki hill), situated about 2 miles south-westward of Changtiao point. Between these ridges is Hsiao chiang kou (Siau kong creek), which is navigable for small craft, and enters the sea under Wang yuan fort, nearly one mile westward of Changtiao point. Close south-westward of this fort is Li shan (Lookout hill), a hill 236 feet (71m9) high with a lookout tower on its summit. Chinchi shan has a mound on its summit; a reef extends into the river from the foot of this hill, and on it is Siu yuan fort (*Lat. 29° 58′ N., Long. 121° 44′ E.*).

The western entrance point of the river is a promontory rising to an elevation of 291 feet (88m7); this hill, named Chaopao shan (Citadel hill), has two large temples on its summit. The country for many miles westward of Chinhai is flat.

The bar of the river is mud, and extends for about 1¼ miles into the river from a position about one cable southward of Futsun shan; in 1935 it was reported that the depths in the channel over the bar had altered considerably, and at times there were depths of only from 10 to 12 feet (3m0 to 3m7) in this vicinity; the channel only scours again after heavy freshets. There are always numerous junks and other small craft, both moored and under way, in the entrance to the Yung river.

Charts 1429, 1199, 2412, 1262.

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Chart 1592.

The river.—Lights.—Anchorage.—The city of Chinhai is surrounded by a massive wall, and has large suburbs on both sides of the river. A sloping wall of masonry protects the city and the flat country westward from the inroads of the sea. There is a stone jetty at Chiang nan (Kiang nan), a village on the southern banks opposite Chinhai, and a light is exhibited, at an elevation of 26 feet (7^m9), from a black beacon with a black spherical daymark on the head of the jetty.

Anchorage can be obtained off the south-eastern corner of Chinhai, in a depth of about 5 fathoms (9^m1), but it is necessary to moor; the navigable portion of the river above this is about one cable wide, and is usually crowded with junks.

A light is exhibited, at an elevation of 35 feet (10^m7), from a wooden pole surmounted by a black sphere situated on the northern side of the river and nearly 1½ miles westward of the light-beacon on the head of Chiang nan jetty. A light is exhibited from a similar structure near Mei-su, a village situated about midway between Chinhai and Ningpo.

Charts 1592, 1429.

Directions.—The depths in the Yung river and approaches have altered considerably in recent years and the charts must be used with caution; local knowledge is essential for entering the river. The following directions are merely intended as a guide to the general route to be taken until the pilot is met with near Nemesis rock.

Vessels approaching Yung river from the northward should pass about 4 cables westward of Kanyu (page 265) and the same distance westward of the south-west point of Taiping shan; thence continue on a southerly course until the temples on Chaopao shan are in line with the south-eastern side of Tayu shan, bearing about 240°, when steer a south-westerly course until Futsun shan lighthouse opens southward of Tayu shan, bearing about 254°, following this mark until the pilot is taken on board.

Vessels approaching Yung river by Chintang channel (page 264) should pass about half a mile northward of Yu en su (page 261), half a mile southward of Huangniu chiao, half a mile southward of Shuang chien, 4 cables northward of O chiao, and then steer for Futsun shan lighthouse, bearing about 254°, as above.

Chart 1592.

Ningpo.—The Chinese city of Ningpo is situated immediately above the junction of the Yuyao and Fenghwa, its walls extending along the banks of both branches. The foreign settlement is on the western bank of the main river, and the Yuyao flows round its northern and south-western sides. The former British Consulate (*Lat. 29° 53′ N., Long. 121° 33′ E.*), a red building, is situated in the foreign settlement and on the western bank of the main river; the Custom house is about 1½ cables south-westward of the Consulate. The English church, with a spire, is situated on the road which leads inland from the Custom's flagstaff, just across the railway behind the former British Consulate. There is no British consul at Ningpo, but a vice-consul from Shanghai visits the city occasionally.

There are four large pontoons, with depths of from 12 to 24 feet (3^m7 to 7^m3) alongside; passenger steamers with a draught of over 11 feet (3^m4) berth alongside the three lower ones daily, but they

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Chart 1592.

frequently rest on the bottom at low water. A bridge of boats or pontoons across the Yuyao connects the foreign settlement with the city, and there is a similar bridge, which was being replaced by an iron bridge in 1936, across the Fenghwa; any of the pontoons in the centre of these bridges can be removed, by giving notice, to allow the passage of small craft.

Vessels moor in mid-stream off the foreign settlement, in depths of from 3½ to 5 fathoms (6m4 to 9m1). There are four swinging berths for vessels up to 320 feet (97m5) in length. No. 1 berth is immediately above the Custom house, No. 2 is between the Custom house and the former British Consulate, No. 3 is below the Consulate, and No. 4 is opposite the foreign cemetery. It is advisable to have a taut moor, with four shackles on the upstream cable and three shackles on the downstream cable; vessels coming in with the flood stream anchor above their berth, swing to their anchors, keeping them at short stay, then weigh and moor. The maximum rate of the flood stream is about 2 knots, and that the ebb stream from 2 to 3 knots. At neap tides in late September, 1935, it was observed that there was no morning flood stream on three consecutive days, one to two hour periods of slack water being experienced instead. High water at Ningpo occurs one hour after high water at Chili.

The most convenient landing place is at the Custom house, but there is not sufficient depth for a boat from two hours before to two hours after low water; the Custom officials will place a sampan at their steps on request, and sufficient depth will be found alongside the sampan.

Storm signals.—Storm signals are exhibited at the Custom house flagstaffs at Ningpo and Chinhai; *see* Supplementary storm signals on page 33. The direction from which gales are expected is signalled as follows:—

N.W. quadrant: By day, one cone point upward; at night, two *red* lights disposed vertically.

S.W. quadrant: By day, one cone point downward; at night, two *white* lights disposed vertically.

N.E. quadrant: By day, two cones points upward, disposed vertically; at night a *red* light above a *white* light.

S.E. quadrant: By day, two cones, points downward, disposed vertically; at night, a *white* light above a *red* light.

At Ningpo the direction symbols are hoisted on the north-west yardarm for gales from the N.W. and N.E. quadrants, and on the south-east yardarm for those from the S.W. and S.E. quadrants.

At Chinhai the direction symbols are hoisted on the north yardarm for gales from the N.W. and N.E. quadrants, and on the south yardarm for those from the S.W. and S.E. quadrants.

Harbour facilities.—A moderate stock of coal of poor quality is kept; the coal is delivered by baskets from lighters, and the process is very slow. A small quantity of fuel oil and Diesel oil is stocked.

Fresh provisions are plentiful. Two days' notice must be given to the Harbour master for water, and it is fetched from up the river by junks.

There is railway communication with Hangchow and Shanghai. There is frequent steamer communication with Shanghai and with the principal ports of the Chusan archipelago. Launches ply between Ningpo and Chinhai, and between Ningpo and Yuyao. Ningpo is connected to the general telegraph system.

Charts 1429, 1199, 2412, 1262.

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Chart 1592.

Shipping.—In 1935, 1,052 steam vessels with an aggregate of 1,606,684 tons entered the harbour.

Chart 1199.

HANGCHOW BAY.—Hangchow bay lies westward of the line between the mouth of the Yung river and Nan hui tsui (Yangtze cape), about 55 miles northward. The bay is comparatively shoal, especially in the southern part, where there are generally depths of from 2¾ to 4 fathoms (5m0 to 7m3); in the northern part these increase to from 4 to 6 fathoms (7m3 to 11m0). At the head of the bay is the estuary of the Tsien tang kiang, and the important city of Hangchow is situated about 20 miles up this river; on the northern shore of the bay are the small cities of Haiyen and Chinshan.

Southern shore.—Light.—The coast between Chinhai and Fulung shan (Talung island), about 11½ miles north-westward, is partly hilly and partly flat, cultivated land; the latter is protected from the sea by an embankment. A mud bank dries out for about 1¾ miles outside this embankment. Nilo shan (Friendly island), 217 feet (35m7) high, with several rocks off its northern side, lies on the mud bank about 7 miles north-westward of Chinhai; a light, privately maintained, is exhibited, at an elevation of 226 feet (38m4), from a white tower on the summit of Nilo shan (*Lat. 30° 03′ N., Long. 121° 39′ E.*). Fulung shan is a bluff headland 912 feet (278m0) high. Westward of Fulung shan the land is low, cultivated, and fronted by a broad mud bank.

Northern shore.—Lights.—The northern shore of Hangchow bay, between Nan hui tsui (page 294) and Chapu, about 42 miles south-westward, is low and is fronted by a mud bank which dries out to as much as 2 miles in places.

Chapu, an old Chinese city, is now little more than a fishing village; it was formerly the port of Hangchow, and its position may be known by a ridge of hills, the highest being 509 feet (155m1) high, extending along the coast for about 3½ miles north-eastward of the city, as well as by the islets which protect the roadstead from the eastward; on one of these islets, lying close to the coast about 2 miles eastward of the city, is a conspicuous white house. Holley islet, the outermost islet, lies south-eastward of Chapu and nearly one mile offshore. Lights, privately maintained, are exhibited on the summit of Ta meng shan, an islet lying about half a mile north-north-eastward of Holley islet, and on the coast about 1½ miles north-westward of Holley islet. A mud flat, which dries, extends as much as one mile from the coast between Chapu and Haiyen, situated about 8½ miles south-westward; the outer edge of this flat is steep-to, and sounding gives no warning. The tidal streams in the anchorage southward of Chapu attain a rate of 5 knots at spring tides. Chapu is connected with the general telegraph system.

Islets and dangers in Hangchow bay.—Tunghuo shan (Nanho), about 11½ miles north-eastward of Fulung shan, is 194 feet (59m1) high; a shoal, with depths of less than 3 fathoms (5m5), extends about 2 cables north-eastward from it. Wang chiao, 20 feet (6m1) high, lies about three-quarters of a mile northward of Tunghuo shan; foul ground extends nearly 2 cables northward and south-eastward from this rock.

Charts 2412, 1262.

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Chart 1199.

Hsihuo shan (West stork), about 3½ miles westward of Wang chiao is 139 feet (42m4) high; an islet, 94 feet (28m7) high, lies close off its south-eastern side. Changtan shan (Reef islands) consists of several islets and rocks, the largest of which, 72 feet (21m9) high, lies about 2¼ miles west-south-westward of Hsihuo shan. These islets lie at the south-eastern end of an extensive patch of foul ground, with numerous rocks which dry, and are surrounded by soft mud and quick sand. Chitzumei (Seven Sisters) lie on this foul ground within a distance of 3 miles northward of Changtan shan; the largest of them is 131 feet (39m9) high.

Chuyu shan (East Seshan) is a group of islets and rocks, the largest of which, lying about 19 miles northward of Tunghuo shan, is 271 feet (82m6) high. Hsu shan (Middle Seshan) consists of one island, situated nearly 5 miles west-north-westward of Chuyu shan, with several islets or rocks around. House islet, about 2¾ miles south-westward of Hsu shan, is cliffy; a small islet lies about one mile north-eastward of House islet, and a rock, with foul ground for nearly a quarter of a mile around, lies about 1¼ miles south-eastward of House islet. There are numerous fishing stakes between all these islets and the northern shore of Hangchow bay.

Chin shan (West Seshan) is a group of three islets, the largest of which, 298 feet (90m8) high, lies about 10 miles north-westward of House islet (*Lat. 30° 35′ N., Long. 121° 35′ E.*).

Wangpan shan (Flat Fog) is an islet about 12½ miles west-south-westward of House islet; two small islets, or rocks lie within half a mile southward of it. Gap Fog are two small islets, the southern of which lies about 1½ miles westward of Wangpan shan.

Charts 1199, 3522.

Tsien tang kiang.—Safe navigation for sea-going vessels ends near Rambler island, which is about 11½ miles south-westward of Holley islet. Steamboats proceeding to Hangchow should not start until half-tide; they will then, if able to steam 4 knots with a 3-knot minimum flood stream, reach Haining, a distance of 23 miles from Rambler island, before high water at that place. The best plan for ships' boats is to ground on the southern bank of the river, 3 miles westward of Haining, as the junk shelters on the sea wall are hard.

The bore having passed, boats should proceed to the city as soon as they float, taking advantage of the following flood, and keeping on the northern bank of the river. The distance from the grounding place mentioned above to a safe position just eastward of Hangchow is 18 miles.

Boats of more than 3 feet (0m9) draught should not be used for communicating with Hangchow.

Junks take three days going from Chapu road to Hangchow, and shelter firstly in Bore Shelter bay, and secondly at Haining platform.

The return from Hangchow to Chapu road cannot be safely accomplished under three tides in any boat. A boat should leave Hangchow immediately after the bore has passed, and secure at or opposite Haining; after the next high water, proceed to Bore Shelter bay, and at the next high water after arrival there proceed to Chapu road.

Navigation between Bore Shelter bay and Chapu road is not safe in strong winds, on account of the violent overfalls. Boats should not start at night except with a pilot.

Charts 2412, 1262.

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Charts 1199, 3522.

Bore of the Tsien tang kiang.—At full and change of the moon the bore of the Tsien tang kiang originates between 1000 and 1030 in the vicinity of the meridian of Chi san, a conspicuous hill 12 miles east-south-eastward of Haining, and on a still night it can be heard at Haining half an hour after its formationl The bore is composed of two branches; the main and higher branch keeps along the shore, touching the sea wall with its northern extremity, and the sands with its southern extremity; the other branch appears at Haining from the south-eastward, touching the sand on both sides. At 4 miles from Haining the branches join, the southern extremity of the first with the northern extremity of the second, making a continuous white line 2 miles in length. Shortly afterwards the bore commences to contract in width, increase in speed, and rise in height, conforming to the mouth of the river. At 2 miles from Haining the flood stream, probably that from the south-eastward, which runs through the other, charges into the sea wall. There is no particular effect at the wall itself, but a violent rebound, causing a tumultuous rising of the water in waves several hundred yards behind and twice as high again as the front of the bore. These waves exist for many minutes, travelling southward or south-westward, and subside on to the back of the bore. Usually, as the moon crosses the meridian, the bore passes Haining, where it is nearly a straight line across the river, 9 cables wide, 8 to 11 feet (2^m4 to 3^m4) high, and travelling at a rate of from 12 to 13 knots; its front being a uniform sloping cascade of bubbling foam, falling forward and pounding on itself and on the river before it at an angle of between 40° and 70°. The highest and steepest part is over the deep channel of the river.

Chart 3522.

The northern end of the bore swells up to the sea wall as it passes along, but the southern end, meeting an incline of sand which only rises 19 feet (5^m8) in $1\frac{4}{10}$ miles, trails away in a tapering wall of very delicate breakers, which terminate half a mile in rear of the bore or where it passed 3 or 4 minutes previously. The river fills up to the level of the bore soon after it passes, but not evenly. The height, speed, and regular appearance of the front are maintained for 15 miles above Haining, after which the height decreases; the bore passes Hangchow fu at 1345, soon after which it breaks up and disappears.

A quarter of an hour after the bore has passed Haining (*Lat. 30° 25′ N., Long. 120° 32′ E.*), the water has risen 13 feet (4^m0); at 1400 it has risen 18 feet (5^m5); it is high water at 1500, when the tide has reached a height of 19 feet (5^m8), and the stream at once commences to run out swiftly. At 1700 it is at the mean level; at 2000 it is nearly low water. The out-going stream, however, continues to run rapidly eastward until the arrival of the next bore. The water is at its lowest for the 2 hours preceding the bore.

At Haining the flood lasts 3 hours, the ebb 9 hours. At Hangchow fu the flood continues $1\frac{1}{4}$ hours, and is nearly all in the bore.

There is no place in the river where boats can be secured in safety $2\frac{1}{2}$ hours after high water. All traffic between Haining and Hangchow fu begins soon after the bore has passed, and ends 2 hours after high water, a period of from 3 to 4 hours.

On the southern bank of the Tsien tang kiang, the stream—at any rate for 5 or 6 miles inside the mouth of the river—commences to run out strongly an hour before high water at Haining.

Charts 2412, 1262.

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Chart 3522.

The bore abreast Hangchow fu, if it occurs at all, is not regarded in any way dangerous for 15 or 20 days in the month. At Haining the natives state positively that it comes with every flood tide, but that in calm weather and neaps it is only 2 or 3 feet (0^m6 or 0^m9) high.

The bore is probably always dangerous on account of its speed, and at springs it is most formidable. Navigation for ships is impossible.

When the moon is in perigee at full or change, or when there are strong northerly or easterly winds in the Chusan archipelago, the bore generally arrives early off Haining, travels at a greater speed than usual, and is also higher. The bores on the 8th, 9th, and 10th of October, 1892, the moon being in perigee on the 7th, and full on the 6th, were from 11 to 12 feet (3^m4 to 3^m7) high, and passed Haining from half an hour to $1\frac{1}{2}$ hours before the moon crossed the meridian, travelling at a rate of from 13 to 14 knots. High water rose 22 feet (6^m7), or $1\frac{1}{2}$ feet (0^m4) from the top of the seawall abreast the pagoda.

The Chinese expect the highest bore on the 18th day of the 8th moon, which, in 1892, was the 8th of October.

Hangchow fu.—Hangchow fu, a most ancient city, is situated on the northern bank of the Tsien tang kiang, 20 miles above its entrance, from which it is separated by a belt of clean sand about 2 miles in width, and it derives its importance chiefly from the fact that it is the capital of the province of Chekiang. As such it is a political, administrative, educational, and social centre, rather than a commercial or industrial emporium. Although it taps the trade of the Tsien tang kiang valley, a large proportion of the goods brought down that river is transhipped and taken by inland waterways to Shanghai.

The city is also remarkable for its fine situation, a chief feature of which is a beautiful lake, named Si hu (West lake), close westward of the city, and surrounded by a picturesque range of hills. The city is enclosed by a wall faced with hewn stone about 13 miles along its perimeter; this wall is from 30 to 40 feet (9^m1 to 12^m2) high, 20 to 30 feet (6^m1 to 9^m1) broad, and is pierced by ten large gateways.

Hangchow (*Lat. 30° 16′ N., Long. 120° 11′ E.*) was opened as a Treaty port in 1896, and the foreign settlements are situated about 5 miles northward of the city and 10 miles from the river. The Grand canal, the other end of which is at Tientsin, ends about one mile from the northern gate of the city, but it is extended, by means of a mud slide, or haulover, within the walls, and joins the other canals with which the country is intersected. Eastward of the Grand canal, and parallel with it, is another canal joining Hangchow with Haining.

There is railway communication with Ningpo and Shanghai, and the city is connected to the general telegraph system.

Chart 1124.

SOUTHERN APPROACH TO THE YANGTZE KIANG.— Between the Chusan archipelago and the estuary of the Yangtze kiang are numerous islands, divided into four main groups, namely:— Ta chu san (Tsu san) and its adjacent islands, Chi chu lieh tao (Rugged islands), Pa ke lieh tao (Parker islands), Ma an lieh tao (Saddle group). There are navigable passages between these groups, but the usual route for vessels bound for the Yangtze kiang is through Bonham strait (page 285).

Outside the main group of islands there are several small groups of islands and dangers.

Charts 1199, 2412, 1262.

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Chart 1124.

Outlying islands and rocks.—Lukon islands are a group of three uninhabited islands, the south-western of which lies about 19 miles north-north-eastward of Video (page 249). The islands are barren and precipitous on their eastern sides, and rocks extend 2 cables off them in places; between the middle and south-western islands are two noticeable rocks, 99 feet (30m2) and 66 feet (20m1) high, respectively.

Beehive, nearly 13 miles west-south-westward of the south-western Lukon island, is a black, rugged rock, 46 feet (14m0) high. A flat-topped rock, which dries 7 feet (2m1), lies about 1½ cables south-eastward of the Beehive, and a pinnacle rock, with a depth of 1½ fathoms (2m7), lies about 4 cables north-north-westward.

Tung pan yang chiao (Childers rock), about 11 miles north-north-westward of the northern extremity of the Lukon islands, is a pinnacle which dries 3 feet (0m9); it is steep-to except on its northern side, where a narrow ledge, with a depth of 2 fathoms (3m7), extends about one cable. Sounding gives no warning of the rock, and even at half tide the sea does not break over it.

Tung tao (Barren islets) consists of three islets and a number of rocks; the western and largest islet lies about 20 miles north-north-eastward of the eastern Lukon island. Foul ground extends about 6 cables south-eastward from the eastern islet, and terminates in a rock which dries 10 feet (3m0), on which the sea breaks heavily. Heavy breakers, which were reported to have been seen about one mile southward of these islets, were unsuccessfully searched for in 1893, and it appears probable that these breakers were on the rock just mentioned.

TA CHU SAN AND ADJACENT ISLANDS.—Ta chu san (Tsu san), the largest island of this group, lies with Worth point, its south-eastern extremity, about 13 miles west-north-westward of the Beehive. The highest peak, 1,054 feet (321m3) high, is sitiuated in the south-western part of the island, and on this summit is a joss house surrounded by a wall; the plains on the island are cultivated, and there is a large population, principally inhabiting the western and northern parts of the island, where there are numerous villages. The coasts are indented by numerous bays, but these are entirely filled by mud flats, on which are islets and rocks.

Evans islets, off the west coast of Ta chu san, are a group of three islets close together, the largest of which is 126 feet (38m4) high, and lies about three-quarters of a mile north-westward of Pennell point, the south-western extremity of the island. McCauley islet lies about 2 miles west-south-westward of Hay point, the north-western extremity of Ta chu san, and is nearly divided into two; a rocky islet, about 30 feet (9m1) high, lies close north-westward of it.

Croker point (*Lat. 30° 28′ N., Long. 122° 23′ E.*) is the eastern extremity of a conspicuous promontory which extends about 1½ miles northward from about the middle of the north coast of the island. Dyer islet lies close off the north-east point of Ta chu san and nearly 3 miles south-westward of Croker point.

Anchorage in moderate depths can be obtained off almost any part of the island by vessels with local knowledge, and shelter can thus be obtained from any wind; anchorage near Pennell point, however, is not recommended, as the tidal streams here may attain a rate of from 5 to 6 knots. Anchorage, available in a typhoon, may be had off the north coast of the island, westward of the promontory which terminates

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Chart 1124.

eastward in Croker point; this anchorage is sheltered by the islands lying northward of Ta chu san.

Islands eastward of Ta chu san.—Balfour islands, separated from Ta chu san by Balfour passage, are a group of six islands with some islets and rocks. Andrew island, the largest, is of a light colour; a large fishing village is situated on the shore of Worth harbour, a shallow bay on the south-western side of the island, and at certain seasons fishing craft are numerous, as many as 1,200 having been in sight at one time from the anchorage. Vessels with local knowledge can obtain good anchorage, in depths of from 5 to 7 fathoms (9m1 to 12m8), sheltered from east to north-west, through north, with the western extremity of Andrew island bearing 334°, distant three-quarters of a mile; also in depths of from 5 to 6 fathoms (9m1 to 11m0), south-eastward of Francis island, the south-western island of the group, sheltered from northerly winds.

Balfour passage has depths of from 7 to 24 fathoms (12m8 to 43m9) in the fairway. Off the west point of Andrew island the passage is contracted to a width of about 3 cables by a pinnacle rock, with a depth of 6 feet (1m8) over it, lying about 1½ cables north-westward of this point; on the western side of the passage there is a small rock 2 feet (0m6) high, with a rock which dries 2 feet (0m6) close westward of it. When navigating Balfour passage vessels should pass fairly close to the 2-foot (0m6) high rock.

Hobson islands are three small islands lying eastward of the Balfour islands. Some rocks, one of which is 4 feet (1m2) high, lie about a quarter of a mile westward of the western Hobson island, and rocks extend about 3 cables westward from Elgar island, the eastern island of the group. The passage between the Hobson and Balfour islands is fully three-quarters of a mile wide, and is deep in the fairway; it is occasionally used by steam vessels, but the route eastward of Elgar island is recommended.

Light.—A light is exhibited, at an elevation of 205 feet (62m5), from a white circular tower 26 feet (7m9) in height, on the eastern extremity of Elgar island (*Lat. 30° 26′ N., Long. 122° 31′ E.*).

Islands northward of Ta chu san.—Parry island, about 1½ miles north-eastward of Croker point, is rocky and barren; a rock awash lies about half a cable off the east point of the island. A rock, with a depth of 2 fathoms (3m7), lies about midway between Parry island and the eastern of the two Simpson islands, situated about 1½ miles westward; a rock, which dries 8 feet (2m4), lies in the passage between the latter island and the northern extremity of the Croker promontory. A rock, 9 feet (2m7) high, lies close north-eastward of the eastern Simpson island, and two rocks above water lie close off the northern side of the island; a rock awash lies about half a mile northward of its north point. The western and smaller Simpson island is 110 feet (33m5) high; a pinnacle rock, with a depth of 4 feet (1m2) over it, lies about 1½ cables eastward of this island, and a ridge of rocks, with a depth of 4 feet (1m2) on the outer end, extends about one cable from the north point of the island.

Beal island lies with its south-eastern extremity about one mile north-westward of the western Simpson island; it is covered with grass and is inhabited. Elvy rock, 3 feet (0m9) high, lies about half a mile north-north-eastward of the south-east point of the island.

Charts 1199, 2412, 1262.

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Chart 1124.

Dawson islands, between Beal island and the north-western extremity of Ta chu san, comprise Henry island and numerous smaller islands, which all, except the easternmost, lie together on a shoal with depths of less than 3 fathoms (5m5). Paymaster passage, between the Dawson islands and the north-western end of Ta chu san, has irregular depths of from 5 to 17 fathoms (9m1 to 31m1) in the fairway. An island, 130 feet (39m6) high, lies about 3 cables northward of Hay point, and the route lies southward of this island, but a bank, with a depth of 3½ fathoms (6m4), must be crossed westward of the island. A number of rocks, some above water, lie on the southern side of Paymaster passage; one of these is a conspicuous black sugar loaf rock, 56 feet (17m1) high, which lies nearly 1½ miles eastward of Hay point. The tidal streams in this passage are rapid.

Bassett island, about 2¼ miles westward of Beal island, is covered with grass and stones, and is inhabited; a shoal, with depths of less than 2 fathoms (3m7), extends about half a mile eastward, and also about a quarter of a mile westward, from the island. The two Smith islands lie between Beal and Bassett islands. The channel between Beal and Bassett islands on the north, and the Dawson islands on the south, has depths of from 6 to 24 fathoms (11m0 to 43m9) in the fairway, but it is usually encumbered with fishing nets; a rock with a depth of 6 feet (1m8) over it, lies about one mile westward of the north-west point of Henry island and in the southern half of the channel.

CHI CHU LIEH TAO.—Dangers.—Anchorage.—Chi chu lieh tao, the westernmost group of islands in the southern approach to the Yangtze kiang, lies north-westward of Bassett island; they are inhabited by a fishing population. *See* view facing pages 282, 283.

Ta yang (Da yung san), the largest island of the group, lies with its southern extremity about 10 miles west-north-westward of Bassett island, and is covered with grass and cultivation; it has two conspicuous peaks, one on the southern part and the other on the western extremity of the island. The principal village is situated on the shore of the bay on the eastern side.

Huxley rock (*Lat. 30° 34′ N., Long. 122° 05′ E.*), with a depth of 2 feet (0m6) over it, lies about three-quarters of a mile south-eastward of the south point of Ta yang; a rock, which dries 8 feet (2m4), lies about 1¾ miles eastward of this point. Huxley rock is covered by a *red* sector of South-west Horn light between the bearings 186° and 290°. A rock awash lies about 3 cables northward of the north point of Ta yang.

Good anchorage can be obtained by vessels with local knowledge off the bay on the eastern side of Ta yang, in depths of from 4 to 6 fathoms (7m3 to 11m0); when approaching the anchorage, the highest peak of Hsia yang bearing 337°, and just open eastward of the southern entrance point of the bay, leads about 3 cables eastward of Huxley rock.

Hsia yang (Tripoint island), about 2 miles north-north-westward of Ta yang, has three peaks of nearly equal elevation. There are several islets, rocks and shoals between these two islands. Spire islet, about half a mile south-eastward of the south-east point of Hsia yang, is a remarkable pinnacle 214 feet (70m2) high. None of the others has any distinguishing feature. South-east Horn, lying about 5 miles south-eastward of Hsia yang, is the easternmost island of the group; North-east Horn, about 1¾ miles north-north-westward of South-east Horn, is the north-eastern island of the group.

Charts 1199, 2412, 1262.

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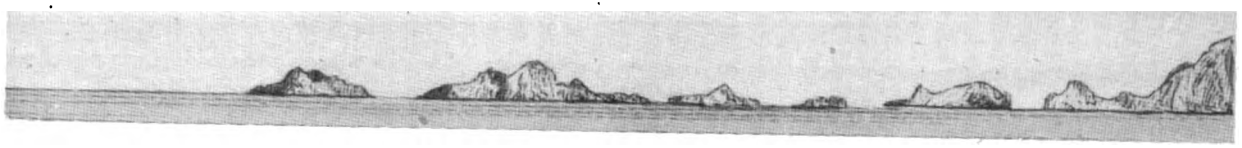

South-west Horn, bearing 297°, 5 miles.
(Lighthouse not shown.)

Pirates bay.

View, in six parts, of Chi chu lieh tao from southward. (*Continued overleaf*).

(*Original dated 1844*).

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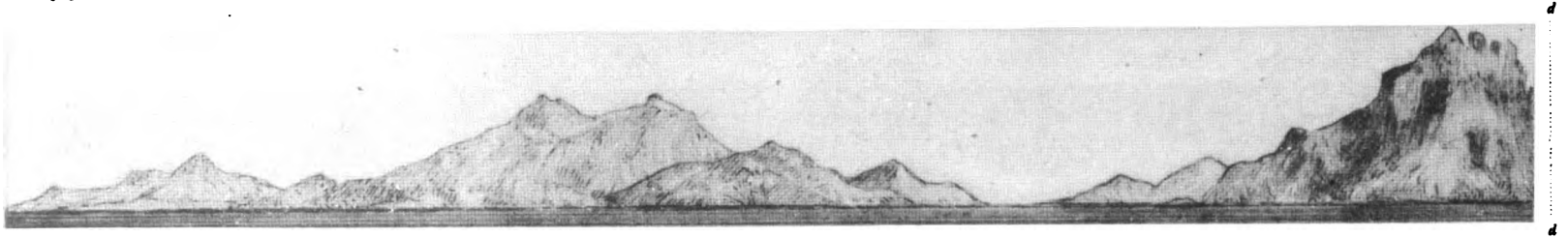
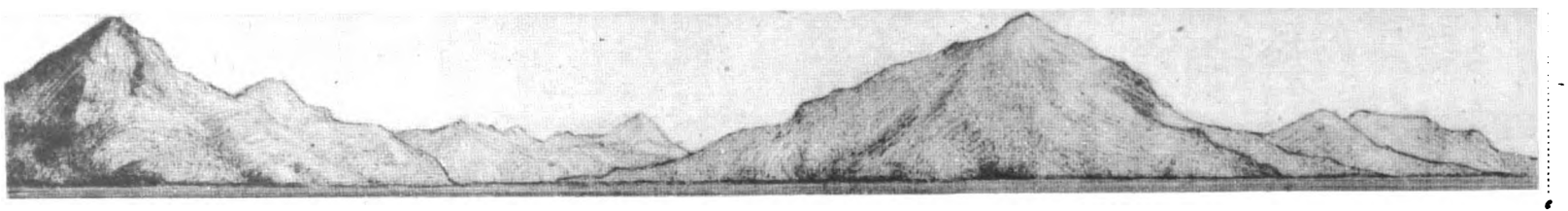
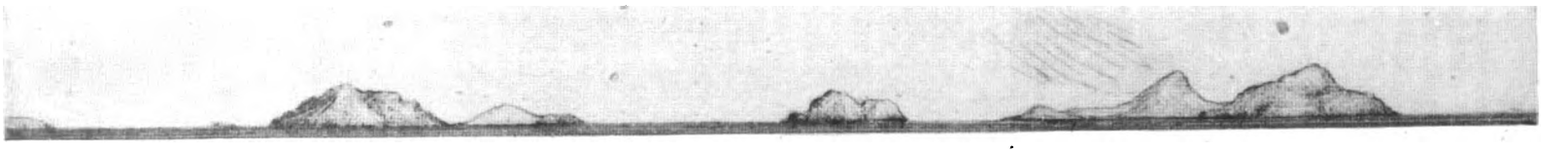
To face page 283.



Hsia yang.



Ta yang, hearing 040°, 1½ miles.



South-east Horn.

View, in six parts, of Chi chu lieh tao (*Continued from previous page*).

(*Original dated 1844*).

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Chart 1124.

South-west Horn is the westernmost of a chain of islets extending about 4½ miles westward from Ta yang; North-west Horn, the north-western island of the group, lies nearly 4½ miles north-north-eastward of South-west Horn. A 4-fathom (7m3) patch lies about a quarter of a mile northward of North-west Horn. Hoar rock, about three-quarters of a mile west-north-westward of North-west Horn, is a pinnacle with a depth of 4 feet (1m2); this rock is covered by the *red* sector of south-west Horn light between the bearings 186° and 290°.

Light.—Fog signal.—A light is exhibited, at an elevation of 95 feet (29m0), from a white lantern on a white dwelling, 23 feet (7m0) in height, on the summit of South-west Horn. *See* view facing page 284.

A fog signal is sounded from the lighthouse.

Charts 1124, 1602.

Islets and rocks northward of Chi chu lieh tao.—Hsiao chi san (The Hen) is a precipitous islet about 4 miles northward of Hsia yang; its northern extremity is broken up into several rocks from 30 to 40 feet (9m1 to 12m2) high; two rocks, one 2 feet (0m6) high and the other drying 7 feet (2m1), lie within a distance of 2 cables northward of the islet.

Ta chi shan (Gutzlaff island) lies about 8½ miles north-eastward of Hsiao chi san and is covered with vegetation. Sunken rocks lie within about 2 cables of its southern and western extremities, and a rocky ledge, terminating in a conspicuous black rock 9 feet (2m7) high, extends about 2 cables eastward from the island. A rock, 35 feet (11m0) high, lies about 4 cables northward of Ta chi shan, and a rock, which dries 6 feet (1m8), lies about one cable south-eastward of this rock. The landing place is on the western side of Ta chi shan. *See* view on chart 1124.

Anchorage can be obtained, in a depth of about 6 fathoms (11m0), about 4 cables off the landing place, with the lighthouse bearing 064°, just open southward of a white hut on the south-west coast of the island. Telegraph cables are landed near a small cable house on the western side of the island, and vessels should not anchor in their vicinity. Storm signals are hoisted at the flagstaff near the lighthouse; *see* page 27. Vessels can communicate with the island by the International Code of Signals; it is connected to the general telegraph system.

Light.—Fog signal.—A light is exhibited, at an elevation of 283 feet (86m3), from a white circular steel tower, 46 feet (14m0) in height, situated on the eastern end of the summit of Ta chi shan (*Lat. 30° 49′ N., Long. 122° 10′ E.*).

A fog signal is sounded from the lighthouse, and a W/T fog signal is transmitted.

Tidal streams.—The following table gives the direction and rate of the tidal streams at a position about 4½ miles southward of Ta chi shan:—

Hours before H.W.	Direction.	Rate.	Hours after H.W.	Direction.	Rate.
5	242°	1 knot	1	286°	3 to 4 knots
4	255°	1 to 2 knots	2	312°	2 to 3 ,,
3	259°	2 to 3 ,,	3	352°	2 to 3 ,,
2	260°	3 to 4 ,,	4	027°	2 to 3 ,,
1	266°	3 to 5 ,,	5	067°	3 to 4 ,,
H.W.	267°	3 to 4 ,,	6	077°	2 to 3 ,,

Charts 1124, 1602, 1199, 2412, 1263.

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Chart 1453, plan of Parker islands.

PA KE LIEH TAO.—Pa ke lieh tao (Parker islands) are a group of many islands, islets, and rocks lying south-eastward of Ta chi shan, with a clear passage, fully 10 miles wide, between.

South-western part of the group.—Lights.—Hsu kung tao (Morrison island), about 11 miles south-south-eastward of Ta chi shan, is covered with rocks and grass, and has two sharp peaks 487 feet (148m4) and 439 feet (133m8) high, respectively; on the western side of the island there is a bay, completely filled by a mud flat, with a village at its head. There are several islets and rocks around Hsu kung tao, and the position of these can best be seen on the chart.

Richardson rock, about 1½ miles north-north-eastward of the north point of Hsu kung tao, is a pinnacle with a depth of 3¾ fathoms (6m9) over it; the sea does not break on it, and, except in calm weather, when it is marked by tide-rips, its position is not indicated in any way.

Pi tou chiao (Gangway rock), about 2½ miles southward of the south point of Hsu kung tao, is precipitous and has a sharp double summit, 99 feet (30m2) high. Patterson rock (*Lat. 30° 35′ N., Long. 122° 16′ E.*), nearly a quarter of a mile southward of Pi tou chiao, is a pinnacle with a depth of 3 feet (0m9).

Shang chuan shan and Hsia chuan shan (Davis islands), with several islets and rocks, lie together on a bank with depths of less than 5 fathoms (9m1); Shang chuan shan, the western and highest island of this group, lies about 2¼ miles eastward of Pi tou chiao. Webb rock, about half a mile south-south-westward of the south-west point of Shang chuan shan, is a pinnacle with a depth of 3 feet (0m9), and it is steep-to; except in calm weather, when there are tide-rips, the position of this rock is not indicated in any way. Skinner rock, about 3 cables north-westward of the north-east point of Shang chuan shan, has a depth of 1½ fathoms (2m7) over it, and is steep-to. Hsia chuan shan, about three-quarters of a mile eastward of Shang chuan shan, is 295 feet (89m9) high; a 3-fathom (5m5) patch lies about 2 cables off its eastern side.

Anchorage can be obtained, in a depth of about 10 fathoms (18m3), off the southern side of Shang chuan shan, with the summit of that island bearing 357°, and Pi tou chiao bearing about 275° and just open southward of the south-west point of the island; when approaching this anchorage care must be taken to avoid Webb rock. When in the western semicircle of a typhoon, and unable to make the mouth of the Yangtze kiang, this is a convenient anchorage while waiting for the storm to pass; the tidal eddies are troublesome, but no swell is felt here.

Chai shan (Pirie island), about one mile eastward of Hsia chuan shan, is precipitous; a remarkable thumb rock, 103 feet (31m4) high, lies close off its southern extremity, and one cable farther southward is a rock 37 feet (11m3) high.

Andersen islets are three rocks close together, the middle and largest of which is 76 feet (23m2) high and lies about three-quarters of a mile north-westward of Chai shan; foul ground extends about 2 cables south-eastward from these islets, and terminates in a rock which dries 4 feet (1m2).

Pan yang shan (The Button), nearly 2½ miles northward of Chai shan, is a black, rugged, rocky islet; a rock, with a depth of 5 feet (1m5) over it, lies about one cable eastward of this islet.

Charts 1124, 1602, 1199, 2412, 1263.

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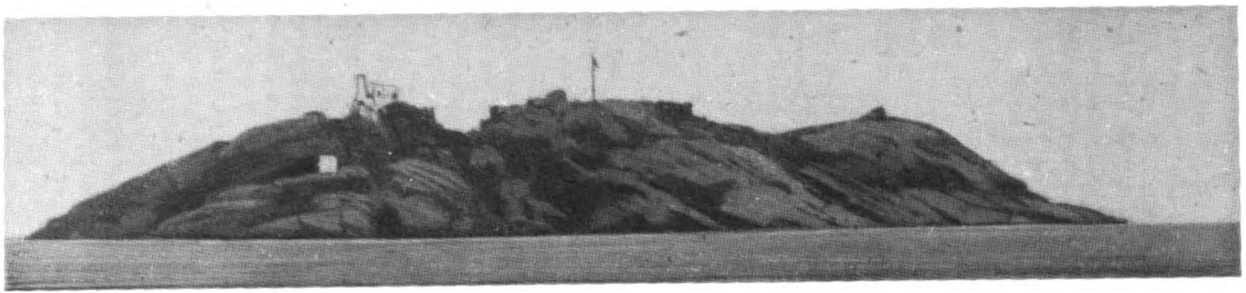
To face page 284.



South-west Horn from southward.

(*Original dated 1932*).

Pa ke lieh tao: Pai chieh shan and adjacent islands.

(*Original dated 1932*).

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Chart 1453, plan of Parker islands.

A light is exhibited, at an elevation of 67 feet (20m4), from a black circular concrete tower, 32 feet (9m8) in height, situated on the eastern end of the summit of Pan yang shan. A fog signal is sounded from the lighthouse.

Pai chieh shan (Bonham island), about 2½ miles east-south-eastward of Pan yang shan, is precipitous on its eastern side; there is a fishing village on the northern side. The landing place is on the western side of the island. A shoal, with depths of less than 3 fathoms (5m5), on which is an island and several rocks, extends about half a mile north-westward from Pai chieh shan. Ying ko shan, an island 203 feet (61m9) high, is separated from the northern end of this shoal by a narrow passage with a depth of 10 fathoms (18m3). Rocks extend about 2 cables southward from the southern extremity of Pai chieh shan, and terminate in a rock 8 feet (2m4) high. An islet, 74 feet (22m6) high, lies nearly half a mile westward of Pai chieh shan; foul ground extends about 1½ cables south-westward from this islet, and terminates in Feng chiao (Bonham rock), awash. *See* view facing page 284.

A light is exhibited, at an elevation of 237 feet (72m2), from a circular tower, 47 feet (14m3) in height, painted red and white in horizontal bands, situated on the southern shoulder of Pai chieh shan (*Lat. 30° 37′ N., Long. 122° 25′ E.*). A fog signal is sounded from the lighthouse.

Good anchorage can be obtained off the south-eastern side of Pai chieh shan, in depths of from 6 to 9 fathoms (11m0 to 16m5), sheltered from north-westerly winds. There is indifferent anchorage off the western side of the island, in depths of from 6 to 9 fathoms (11m0 to 16m5), with the lighthouse bearing 132°, distant from 3 to 4 cables; this anchorage is sheltered from northerly and north-easterly winds, but the tidal eddies are troublesome.

Pan pien shan (Purey island), the western of the two Cust islands, lies with its north-western extremity about 1½ miles eastward of the north-east point of Pai chieh shan. Several rocks, one of which is 5 feet (1m5) high, lie within a distance of 2 cables south-westward of the south-west point of Pan pien shan, and a rock, 12 feet (3m7) high, lies about one cable of the south-east point of the island. The eastern Cust island is 194 feet (59m1) high.

Ti lo chiao (Franklin rocks) lie close together about one mile south-eastward of the south-east point of Pan pien shan; the south-western and higher of the two has a sharp summit 58 feet (17m7) high.

Bonham strait.—Directions.—Bonham strait, between Chai shan and Pai chieh shan, has a least depth of 8 fathoms (14m6) in the fairway, and is generally used by full-powered steam vessels bound for the Yangtze kiang from the southward, or vice versa. The only dangers are Feng chiao and the rock lying about one cable eastward of Pan yang shan, which have already been described.

The lighthouse on Ta chi shan in line with the lighthouse on Pan yang shan, or at night these lights in line, bearing about 315°, leads through Bonham strait and fully half a mile south-westward of Feng chiao; when nearing Pan yang shan course should be altered more to the northward so as to pass fully half a mile eastward of this islet.

It is curious to note that whereas there is no record of any wreck at Pan yang shan before the light was established in 1904, several

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Chart 1453, plan of Parker islands.

accidents have happened since; the explanation is that mariners sometimes fail to appreciate the strength and set of the cross-currents and pass too close to this island, whereas previously they gave it a wide berth. The dangerous tide-races through the strait seem to make vessels quite unmanageable if they pass too close to Pan yang shan.

South-eastern part of the group.—Dangers.—Nan ting hsin (Brooke island), nearly 2¼ miles north-eastward of the eastern Cust island, is covered with grass and has a well defined summit. Cortland rock, about 3 cables south-eastward of the southern extremity of the island, is awash.

Huang lung shan (Senhouse island) lies with its western extremity about 1½ miles eastward of Nan ting hsin; its southern and eastern coasts are bold and rugged. Some rocks lie within one cable of the south-east point of the island, and the outermost of these dries 5 feet (1m5). Several islets and rocks lie off the eastern side of the island; Wai pao shan (The Nut), the outermost of these, lies about one mile eastward of the south-east point of the island and is conspicuous.

Hsiao huang lung (Bruce island) lies close off the western side of Huang lung shan and has three peaks. The narrow channel between these two islands is not available for shipping, as the tidal streams are rapid and a bank, with depths of less than 3 fathoms (5m5), extends northward from its northern end to a line joining the north points of the two islands.

Small vessels can obtain anchorage between Hsiao huang lung and the northern part of Huang lung shan, according to their draught, sheltered except from northerly winds, but there are numerous fishing stakes in this locality.

Szu chiao.—Off-lying islands and dangers.—Light.—Szu chiao (Raffles island), the largest island of the group, lies with its south-eastern extremity about 1½ miles northward of Hsiao huang lung; it has many peaks, the highest, at its south-western extremity, being 715 feet (217m9) high. Anchorage can be obtained nearly all round the islands, but there are shoal depths for some distance off the west coast and also off the western half of the north coast; the anchorage off the southern side of the island is reported to be unsafe. A slope of white sand on the shore of the bay at the eastern end of the island is conspicuous, and shows in misty weather when little else can be seen.

Ma chieh shan (Napier island) lies about three-quarters of a mile southward of the south-western extremity of Szu chiao, with another island, 283 feet (86m3) high, between. There is an excellent boat harbour on its north-eastern side, and there are usually many junks here. A light, privately maintained, is exhibited on the north-east point of the island (*Lat. 30° 41′ N., Long. 122° 25′ E.*).

There are several islets and rocks off the western part of the south coast of Szu chiao; the positions of these are best seen on the chart.

Pei ting hsin (Elliot islands) are a group of three islands, almost connected with each other, and a few islets and rocks; the southernmost island is 236 feet (71m9) high and lies about 1¾ miles westward of the north-west point of Szu chiao. The middle and largest island is precipitous on its eastern side. Niu o chiao (Bisbee rock), nearly three-quarters of a mile south-south-westward of the southern island,

Charts 1124, 1602, 1199, 2412, 1263.

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Chart 1453, plan of Parker islands.

is black, rugged, and 44 feet (13m4) high. A rock, 31 feet (9m4) high, lies about half a mile eastward of the southern island and in the channel between Pei ting hsin and the north-western extremity of Szu chiao; foul ground extends about one cable northward from this rock. Two rocks, 72 feet (21m9) and 54 feet (16m5) high, respectively, lie on the eastern side of this channel and close off the north-western extremity of Szu chiao; a 2-fathom (0m6) patch lies about one cable north-westward of the latter rock. There is good anchorage, in depths of from 4 to 8 fathoms (7m3 to 14m6), in this channel.

Chin chi shan (Chesney island) is separated from the north point of Szu chiao by a narrow boat channel; an islet, 126 feet (38m4) high, lies close off its east point, and there is a good boat harbour within it. An islet, 176 feet (52m6) high, lies about a quarter of a mile northward of the north point of Chin chi shan, with some rocks between; some rocks, one of them 12 feet (3m7) high, lie about half a mile north-north-eastward of this islet. A chain of islets and precipitous rocks extends about 1¾ miles north-eastward from the islet northward of Chin chi shan, and the outermost of these are named the Sentinels.

Wai chiao (Outpost rock), about 2½ miles eastward of Chin chi shan, is 20 feet (6m1) high; foul ground extends about 2 cables from its eastern side.

Pai mou chiao, a rock awash, lies about 7 cables north-eastward of the north-east point of Szu chiao. Wai pai mou chiao (Cairnsmore rock), about 2½ miles eastward of this point, is a pinnacle with a depth of 1¼ fathoms (2m3); the sea never breaks on this rock, and it is not marked in any way except by tide rips when the water is smooth.

Charts 1124, 1602.

MA AN LIEH TAO.—Ma an lieh tao (Saddle group), the eastern-most of the four groups of islands in the southern approach to the Yangtze kiang, is divided into two parts by a clear and deep passage, about 2 miles wide in its narrowest part, running in an east and west direction. *See* view on chart 1199. For tidal streams eastward of Ma an lieh tao, *see* Tables of Tidal streams on charts 1124, 1602.

Southern part of Ma an lieh tao.—Dangers.—Chu chi shan (South Saddle), about 11 miles eastward of Szu chiao, has several peaks, one double summit in the northern part, 651 feet (198m4) high, being considerably higher than the others. Niao o chiao (*Lat. 30° 42′ N., Long. 122° 46′ E.*), a rock 12 feet (3m7) high, with several rocks within a distance of 3 cables north-westward of it, lies nearly half a mile south-south-westward of the south point of the island. Ma an shan (Pony Saddle) is an islet lying about 4 cables off the west point of Chu chi shan; it has a double summit, the western being a few feet higher than the eastern. Foul ground extends about 2 cables eastward from Ma an shan, leaving a narrow passage, with a depth of 8 fathoms (14m6), between it and Chu chi shan. An islet, 81 feet (24m7) high, lies about one cable north-westward of Ma an shan, and is connected to it by a reef. Rocks extend about 3 cables from the north point of Chu chi shan, and an islet, 60 feet (18m3) high, lies off the north-eastern extremity of the island.

Ma ku chiao (McCauley rock), with a depth of 4½ fathoms (8m2) over it, lies about 1½ miles westward of Ma an shan. Hsi pan yang chiao (Bit rock), nearly 4 miles westward of Ma an shan, is a black,

Charts 1199, 2412, 1262, 1263.

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Charts 1124, 1602.

rocky islet 31 feet (9^{m}4) high; a rock, which dries 8 feet (2^{m}4), lies about 1½ cables south-eastward of this islet.

Chen chien shan (East Saddle) is separated from the eastern extremity of Chu chi shan by a passage about 3 cables wide, greatly obstructed by a patch of foul ground, with some rocks which dry from 4 to 7 feet (1^{m}2 to 2^{m}1) in the northern part, and a 2-fathom (3^{m}7) patch in the middle; the tidal streams are rapid through this passage, and it should not be used. The highest peak, 692 feet (210^{m}9) high, is in about the middle of the island, and about 4 cables eastward of this peak is a remarkable boulder, at an elevation of 677 feet (206^{m}3), which is conspicuous from northward and southward. The coasts of the island, expecially the eastern, are rocky and precipitous. The island is inhabited, and there is a village, with a boat harbour, at its western end.

Chart 1453, plan of Alacrity anchorage.

Anchorage.—Caution.—The bight between Chu chi shan and Chen chien shan, southward of the narrow passage between these two islands, affords good shelter with winds from east to west, through north, in depths of from 7 to 10 fathoms (12^{m}8 to 18^{m}3), stiff mud. A considerable swell sets into the bay when the wind is southward of east or west; when this happens at spring tides a vessel becomes tide-rode and should leave. A good mark for entering the eastern part of the anchorage is the conspicuous boulder on Chen chien shan in line with the centre of the conspicuous beach of Godwin cove, bearing about 032°; there are no known dangers in this part, and the depths decrease gradually towards the shore.

Ta kung shan (the northern of the two Hoofs), an islet 156 feet (47^{m}5) high, lies about half a mile south-eastward of Hewitt point, the western entrance point; a reef, which dries 10 feet (3^{m}0), lies close off the north point of this islet. An islet, 64 feet (19^{m}5) high, lies about one cable southward of Ta kung shan. An islet, 40 feet (12^{m}2) high, lies about 1½ cables south-eastward of Hewitt point.

Landing is difficult at all times, and there is a constant scend of from 1½ to 2½ feet (0^{m}4 to 0^{m}7); the only place where it is always feasible is Studd harbour, a small inlet on the western side of the bay. Walker rocks, 6 feet (1^{m}8) high, lie off the entrance to Studd harbour. Baker rocks lie about 6 cables north-eastward of Walker rocks, and one of them is 64 feet (19^{m}5) high; a rocky patch, with a depth of 3½ fathoms (6^{m}4), lies about 4 cables westward of Baker rocks. Owing to the imperfect nature of the survey, the plan must be used with caution.

This anchorage is the resort of numerous fishing craft, which at times fill the bays out to the depth of 8 fathoms (14^{m}6).

The maximum rate of the tidal streams at spring tides is from 2½ to 3 knots, but the farther in a vessel anchors the less tidal stream she will experience; it is only near spring tides that the streams are strong enough to swing a vessel against a moderate breeze.

Should a south-easterly gale be experienced shelter may be obtained off the north-western side of Chu chi shan. North-westerly gales, with heavy squalls, have been ridden out in the bay on the eastern side of Chen chien shan.

Charts 1124, 1602.

North-western part of Ma an lieh tao.—Peng chiao (Spur),

Charts 1199, 2412, 1262.

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Charts 1124, 1602.

about 2 miles northward of Hsi pan yang chiao, is a vertical rock 58 feet (17m7) high, like a mile-stone, and a rock above water lies close northward of it. Tai nan shan (South Stirrup) lies about half a mile north-westward of Peng chiao (*Lat. 30° 45′ N., Long. 122° 40′ E.*), and a rock, which dries 4 feet (1m2), lies about 1½ cables northward of this islet. Hsia san heng shan, about half a mile north-north-westward of Tai nan shan, and Shang san heng shan (Middle Stirrups) are rugged islands, the former being the higher of the two; a pinnacle rock, with a depth of 2 fathoms (3m7), lies nearly half a mile east-north-eastward of Hsia san heng shan. Chih chih shan, Pai tzu shan, and Tung pu shan (North Stirrups) are three islands lying in a north and south direction; Chih chih shan, the southernmost, lies about one mile north-eastward of Hsia san heng shan; Pai tzu shan, the middle island, has a remarkable boulder, at an elevation of 173 feet (52m7), about 1½ cables north-eastward of its summit; between this island and Tung pu shan are many rocks, one of which is 30 feet (9m1) high.

Lu hua shan (Side Saddle) are two inhabited islands connected to each other by a rocky ledge, which can only be crossed by boats at high tide and slack water; the eastern island lies with its east point nearly half a mile northward of Tung pu shan. Two rocks, which dry 12 feet (3m7) and 10 feet (3m0), respectively, lie about 2 cables off the south coast of the eastern island; a rock, 28 feet (8m5) high, with a smaller rock close north-westward of it, lies about 4 cables off the north coast of the western island.

The Buckles are a group of islets and rocks lying in a general north and south direction westward of Lu hua shan. The southernmost islet, which is the most conspicuous, has a conical summit 164 feet (50m0) high; a rock, with a depth of 3½ fathoms (5m9) over it, lies about 1½ cables south-westward of its southern extremity. The northernmost islet is 103 feet (31m4) high. Giffard rock, about 3½ cables westward of this islet, dries 8 feet (2m4).

Good anchorage can be obtained by vessels with local knowledge, in moderate depths, northward and southward of the western Lu hua shan, and also in the bay on the western side of the eastern island. The anchorage southward of the western island is very secure with winds between west and east, through north.

North-eastern part of Ma an lieh tao.—Huang chiao (Crupper islands) are a group of three islets and numerous rocks, the middle and largest of which lies about 3¾ miles east-north-eastward of Peng chiao. The middle islet is 173 feet (52m7) high, and is precipitous on its southern and western sides; a rock, which dries 6 feet (1m8), lies about a quarter of a mile northward of this islet, and there is another rock, which dries 10 feet (3m0), between.

Chan yu (Pillion island) lies about 1½ miles north-westward of the middle islet of Huang chiao; a remarkable needle rock, 19 feet (5m8) high, lies near its southern end. Three rocks above water lie within a distance of about a quarter of a mile southward of the island; two of these are pillar rocks, about 60 feet (18m3) high. Hsiao ching shan (Girth) lies nearly three-quarters of a mile northward of Chan yu; a rock, which dries 4 feet (1m2), lies about a quarter of a mile southward of this islet, and a rock, which dries 7 feet (2m1), lies one cable south-eastward of the islet. Two rocks, which dry 4 and 5 feet (1m2 and

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Charts 1124, 1602.

1^{m}5), lie about one and 1½ cables, respectively, north-westward of Hsiao ching shan. Ta ching shan (Martingale) lies about 4 cables north-westward of Hsiao ching shan.

Hung chiao (Powell rock), which dries 6 feet (1^{m}8), lies about one mile westward of Ta ching shan (*Lat. 30° 49′ N., Long. 122° 42′ E.*). Chi lung shan (Curb), about three-quarters of a mile north-north-westward of Ta ching shan, has steep rocky sides and a sharp summit; there is a safe passage between these two islets and also between Chi lung shan and Tsai chi shan (Snaffle), nearly half a mile north-westward.

Pi hsia shan and Yeh mao tung (False Saddle) are two islands separated from each other by a narrow boat passage; Pi hsia shan, the south-eastern of the two, lies about 2 miles eastward of the eastern Huang chiao. Both islands are inhabited; Pi hsia shan is precipitous on its northern side, and Yeh mao tung has a saddle-shaped summit. Yang she tsui (Blinkers) is a chain of rocks extending about three-quarters of a mile south-eastward from Pi hsia shan; one rock, much higher than the other, is black and 81 feet (24^{m}7) high; the outermost rock is 3 feet (0^{m}9) high, and in fresh winds there are heavy tide-rips off it. There is good anchorage for vessels with local knowledge, in depths of from 4 to 6 fathoms (7^{m}3 to 11^{m}0), mud, in the bay formed between the western side of Pi hsia shan and the southern side of Yeh mao tung; this anchorage is sheltered from winds between north-west and east, through north.

Ta pang shan and Chang han shan, with several islets and rocks (Bridle islands), lie within a distance of 2 miles north-westward of Yeh mao tung; an islet, 134 feet (40^{m}8) high, lies in the passage between the latter island and Ta pang shan. A rock, which dries 11 feet (3^{m}4), lies about one cable off the north-east point of Ta pang shan; there is no safe passage between this island and Chang han shan. Rein, an island about 6 cables westward of Chang han shan, has a double summit; rocks above water extend about 2 cables from its northern and south-eastern sides.

Hua niao shan (North Saddle), the northernmost island of Ma an lieh tao, is covered with rocks and grass and has a saddle-shaped summit; the coasts are rugged and in many places precipitous. The island is inhabited. Shan chiao (Churchill rocks) extend about half a mile south-eastward from the south-east point. Pai chiao (Split island), about half a mile off the north-eastern extremity of the island, with foul ground between, is a precipitous rock. Two rocks, which dry 5 feet (1^{m}5), lie about 3 cables westward of the north point of the island. Vessels with local knowledge can obtain anchorage, in moderate depths, in North bay, South bay, or West bay. North bay is generally used, but in spring and late autumn northerly winds set in without much warning, and departure may be necessary at short notice. A heavy swell sets into South bay, and it is not a good anchorage with winds between south and north-north-east, through east; the tidal streams are strong.

Light.—Fog signal.—A light is exhibited, at an elevation of 273 feet (83^{m}2), from a white circular tower with a black upper part, 54 feet (16^{m}5) in height, situated on the northern extremity of Hua niao shan.

A fog signal is sounded from the lighthouse, and a W/T fog signal is transmitted.

Charts 1199, 2412, 1262.

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CHAPTER VII

THE APPROACH AND ESTUARY OF THE YANGTZE KIANG. THE WHANGPOO AND SHANGHAI HARBOUR.

Chart 1602.

ESTUARY OF THE YANGTZE KIANG.—The Yangtze kiang enters the sea northward of Nan hui tsui (page 294) by three channels, but only one of these, namely South channel, is available for sea-going vessels.

South channel is bounded south-westward by the main coast between Nan hui tsui (*Lat. 30° 53′ N., Long. 121° 53′ E.*) and the entrance to the Whangpoo, about 35 miles north-north-westward, and north-eastward by some partly drying flats, on which are several low islands; these flats terminate eastward in Tungsha banks.

Shaweishan or North channel is entered between the Tungsha banks and Shaweishan, an island about 37 miles north-north-eastward of Nan hui tsui; the channel then leads between the southern side of Tsungming island and the northern side of the flats and islands which form the north-eastern side of South channel. This channel was closed to navigation in 1931.

Chart 1199.

North entrance, along the northern side of Tsungming island, is not marked in any way and is only used by junks; no further description will be given of this channel. Tsungming island is low and highly cultivated, with numerous creeks.

Considerable alterations are constantly taking place in the estuary of the Yangtze kiang, which drains a very large area and is subject to periodic inundations; the most constant part of the river is the entrance to the South channel, but even this channel is subject to change.

Chart 1602.

Tidal streams.—The tidal streams off the entrance to the Yangtze kiang, from Ta chi shan (page 283) to Shaweishan, perform one revolution in twelve hours, turning with the hands of a watch, and there is reason to believe, although the fact has not yet been established, that they preserve the same character for some distance seaward, and far northward. This rotatory movement has been observed when 120 miles northward of the entrance to the Yangtze kiang, and 70 miles from the land.

The stream, from 6 hours until 3 hours before high water, sets in directions from south to west, and from 3 hours before until high

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Chart 1602.

water from west to north; from high water until 3 hours after high water in directions from north to east, and from 3 hours after until 6 hours after high water from east to south. Near the land, or in a locality where a strong wind has been blowing for some time in one direction, or during freshets in the rivers, the above rule may need modification, but as a broad guide it is useful.

During its revolution the direction of the stream changes near Ariadne rocks about 20° every hour, excepting when turning from 315° to 022° soon after high water, and from 135° to 225° about 6 hours after high water, when the change is more rapid.

The rate of the stream varies with the age of the moon between one and 4 knots.

The tidal information given on chart 1602 is a good guide to the streams, and when navigating in the Yangtze approach the course and distance run should be corrected each hour, or oftener, for their set, and this should never be neglected. The direction of the stream, as given therein, is seldom much in error, but the rate is a matter of judgment, and can only be correctly approximated by a careful consideration of all attendant circumstances.

The set on the bank on the southern side of the river entrance, which occurs from about 5 to 7 hours after high water, must be guarded against when entering the Yangtze kiang. In strong northerly winds this southerly set is frequently felt as far within the entrance as the covered portion of the Tungsha banks.

At Tungsha light-vessel the out-going stream is strongest from 3 to 5 hours after high water, when it sets south-eastward at a maximum rate of 6 knots during spring tides, and of 3½ knots during neaps; the in-going stream is strongest from 3 to 2 hours before high water, when it sets west-north-westward at a maximum rate of 3 knots during springs, and of 2 knots during neaps.

In the South channel the streams turn quickly, the stream setting north-westward commencing 4½ hours before high water, and the stream setting south-eastward half an hour after high water. There is very little slack water, and at spring tides the stream setting south-eastward traverses a distance of 24 miles during the whole tide, the maximum rate of 5 knots being attained from 4 to 5 hours after high water. The rate of the stream setting north-westward seldom exceeds 4 knots, the distance run during the whole tide being 16 miles.

Between Tungsha light-vessel and Woosung the tidal streams are considerably stronger in the navigable channel than to seaward, owing to the water being confined within narrower limits by the banks.

With a fresh southerly wind the stream in the vicinity of the Tungsha light-vessel, and for a considerable distance farther eastward, sets northward of east much longer after high water than in calm weather; with a fresh northerly wind the reverse is the case.

During north-easterly winds the stream sets north-westward for a longer period and the level of the water is higher than usual; during south-westerly winds the reverse is the case. South-easterly winds also raise the level of the water. Generally, the prevailing winds and weather modify to a great extent the regularity of both the times of high and low water, and the duration, direction, and rate of the streams.

Caution is necessary in all the Yangtze approaches, especially in thick weather, as the tidal streams are sometimes abnormal, both in rate and direction.

Charts 2412, 1262.

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Chart 1602.

Pilots.—The pilotage waters for the Port of Shanghai extend from the upper limit of the anchorage for foreign vessels at Shanghai to an imaginary line joining Ta chi shan (*Lat. 30° 49′ N., Long. 122° 10′ E.*) and Amherst rocks, and two steam pilot vessels cruise from the latter limit to Tungsha light-vessel.

Application for pilots should be made at the Pilot office of the Licensed Pilots' Association at Shanghai, and, if possible, at least 12 hours notice should be given before the services of a pilot are required. Vessels can communicate with the pilot vessels by wireless, *see* Admiralty List of Wireless Signals.

The pilot vessels have two masts and are painted white, with "Shanghai licensed pilot boat, No. 1" or "2" on both sides. The pilot flag is red and white, the upper half being white.

A pilot vessel with no pilots on board flies flag K of the International Code of Signals.

The pilots are licensed, and are under the control of the Harbour master at Shanghai.

It is not necessary for in-going vessels to await the pilot at the Fairway buoy should the pilot vessel, when farther in on the bar, show the pilot flag. A vessel can then approach the pilot vessel, and take the pilot on board, but should this course be dangerous the pilot vessel will not show the pilot flag, and she may make the signal to anchor.

Caution.—The Chinese Government has defined the Yangtze kiang as a "*narrow channel*" within the meaning of Article No. 25 of the "International Regulation for Preventing Collisions at Sea," from Ichang in latitude 30° 42′ N., longitude 111° 17′ E., to a line joining Nan hui tsui with a position in latitude 31° 00′ 30° N., longitude 122° 07′ 30° E., and thence in a straight line to Shaweishan lighthouse.

The "International Regulations for Preventing Collisions at Sea" are binding on Chinese vessels of foreign type.

Outer anchorage.—In fine weather there is anchorage anywhere between Ma an lieh tao, Ta chi shan, and Amherst rocks. Caution, however, is necessary when anchoring in the approaches to the Yangtze kiang, as, owing to the rotatory nature of the tidal streams, their direction and rate is not exactly known, and there is danger of parting the cable.

Off-lying island and rocks.—Light-vessel.—Buoy.—Light.—Ta chi shan, with its light, has been described on page 283. A light-vessel, painted red, with *Yangtze Entrance* on her sides, is moored about 9½ miles north-north-eastward of Ta chi shan; this light-vessel exhibits a light, at an elevation of 30 feet (9^{m}1), from a tower. A fog bell is rung by the motion of the vessel, but with a smooth sea this signal is unreliable.

Amherst rocks, about 24 miles north-north-eastward of Ta chi shan, are a group of dark rocks, the largest of which is 26 feet (7^{m}9) high. Numerous fishing boats are generally cruising in the vicinity of Amherst rocks, and fishing nets, indicated by the bamboo framework which supports them, are laid out; at night it is almost impossible to avoid them, and the locality should be given a wide berth.

An obstruction, presumed to be a rock with a depth of less than 6 feet (1^{m}8) over it, was reported by the s.s. *Hilda Moller*, in 1934, to lie about 1¾ miles southward of Amherst rocks.

Charts 1199, 2412, 1262.

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Chart 1602.

Niu-pi-chiao lies nearly 7 miles west-south-westward of Amherst rocks; the shoalest head is awash. A red and black chequered whistle-buoy is moored about 2 cables south-south-eastward of this rock; owing to its exposed position this buoy is liable to drag.

Shaweishan (*Lat. 30° 25′ N., Long. 122° 14′ E.*), about 16½ miles north-north-westward of Amherst rocks, is 196 feet (59m7) high and has steep sides; rocks extend about 3 cables from its southern side. From north-north-eastward the island appears flat-topped, with the highest part eastward; from the eastward it appears as a peak; and from about 5 miles south-eastward it appears like two islands, the western being the smaller. Shaweishan is seldom sighted by vessels entering the Yangtze kiang from the southward. Tsungming banks extend westward from the island to the east coast of Tsungming island.

A light is exhibited, at an elevation of 229 feet (69m8), from a black circular tower, 55 feet (16m8) in height, on the summit of Shaweishan; the keepers' dwelling is white. A fog signal is sounded from the lighthouse, and a W/T fog signal is transmitted.

Nan hui tsui.—Light-buoy.—Nan hui tsui, the southern point of the estuary of the Yangtze kiang, is formed by alluvial deposit from this river. About a mile inside the high water line of this cape is an embankment, about 7 feet (2m1) high, which runs in a northerly direction parallel to the coast; it also runs westward, but is less regular in direction here. Many mounds of mud, from 10 to 14 feet (3m0 to 4m3) high, stated by the natives to be graves, exist close outside the embankment about 6 miles westward of the cape; the ground is very swampy. Inside the embankment there are numerous hamlets, and the land is well cultivated. The cape is probably extending eastward; reeds grow up quickly, and hold the mud deposited by the floods. In 1937 a depth of 2½ fathoms (4m6) was reported about 2¾ miles southward of the cape.

A light-buoy, painted black, exhibiting a *white occulting* light *every eight seconds*, light four seconds, is moored about 2½ miles south-eastward of Nan hui tsui.

The tidal streams southward of Nan hui tsui set parallel to the coast; the west-going stream begins soon after low water, and the east-going stream soon after high water. The maximum rate at spring tides is 6 knots, and 3 knots at neap tides.

South channel.—Lights, buoyage and beacons.—The description of the South channel given hereafter is from the latest information available at the time; the banks and channels, are, however, constantly changing, and the light-vessels and buoys are moved accordingly.

The shore on the south-western side of the South channel, between Nan hui tsui and the entrance to the Whangpoo is low, well wooded, cultivated, and partly embanked. Several beacons, for surveying purposes only, are erected at intervals along the shore; these are known as Nan hui tsui beacon, situated about 3 miles northward of Nan hui tsui, Nanhui beacon (*Lat. 31° 05′ N., Long. 121° 51′ E.*), Clump beacon, Kiutoan beacon, Kiutoan Small beacon, and Point beacon. The latter is situated about 3 miles eastward of the entrance to the Whangpoo and is a mast surmounted by a spherical daymark; the remainder are framework structures, each surmounted by a pole

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Chart 1602.

with a spherical daymark, and their positions can best be seen on the chart.

The coast northward of Nan hui tsui is fronted by a mudbank which dries out to a distance of nearly 7 miles east-north-eastward of the cape, and then gradually approaches the coast northward and disappears almost entirely near the entrance to the Whangpoo. The southern part of this bank shelves gradually outside the drying edge, and is known as Sheng tan, but the northern part is fairly steep-to. The bank is of very soft mud, and on its outer parts there are generally large floating fishing stakes in long rows with nets attached to them.

The entrance to South channel is divided into two parts by Tungsha shoal, which lies about 16 miles north-eastward of Nan hui tsui and has a least depth of 1½ fathoms (2m7) over it. A light is exhibited, at an elevation of 23 feet (7m0) from an iron column, painted white, red, green, and black in horizontal bands, surmounted by a black cylinder, erected on Tungsha shoal.

The channels on either side of Tungsha shoal are known as South Fork and North Fork, the latter being the deeper of the two. The entrance to South Fork is marked by Fairway buoy, which is a light-and-bell-buoy, painted red and black in horizontal bands, exhibiting a *white occulting* light *every eight seconds*, light *four seconds*, moored about 5 miles south-eastward of Tungsha shoal light-structure. The entrance to North Fork is marked by Entrance buoy, which is a light-buoy, marked " A ", painted black, and exhibiting a *red occulting* light *every eight seconds*, light *four seconds*, moored nearly 3 miles east-north-eastward of Tungsha shoal light-structure. The southern edge of Tungsha banks, which forms the northern side of North Fork, is marked by Tungsha banks buoy, which is a light-buoy, marked " B ", painted red, and exhibiting a *white occulting* light *every eight seconds*, light *four seconds*, moored about 3½ miles north-westward of Tungsha shoal light-structure.

Tungsha light-vessel, nearly 3 miles westward of Tungsha shoal light-beacon and betweeen South Fork and North Fork, is painted red, with *Tungsha* in white on her sides; the vessel has two masts, each having a ball at the masthead, and a light is exhibited, at an elevation of 32 feet (9m8), from a tower amidships. A fog signal is sounded from the light-vessel.

Kiutoan spit light-buoy is moored nearly 6 miles west-north-westward of Tungsha shoal light-beacon, and about one mile and 2 miles further in the same direction are Kiutoan spit middle and Kiutoan spit upper light-buoys, respectively; these three light-buoys are painted red and exhibit *white occulting* lights *every eight seconds*, light *four seconds*. They mark the northern side of the fairway through South Fork, and the southern side of a channel which was being dredged, in 1936, through Tungsha bar. The northern side of this dredged channel is marked by three light-buoys, numbered 3, 5, and 7 from seaward, exhibiting *red occulting* lights; these three light-buoys are for dredging purposes, and have no navigational characteristics.

Tungsha bar is a continuation south-eastward of Middle ground, which is almost connected to the shoal which extends south-eastward from Yuan-yuan-sha and partly dries. A beacon, consisting of a grey iron column with a black frustum daymark, is situated about 10 miles

Charts 1199, 2412, 1262.

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Chart 1602.

north-westward of Tungsha shoal light-structure; it is only for use in connection with dredging operations, and is known as Middle ground beacon.

Kiutoan light-vessel, about 11 miles north-westward of Tungsha shoal light-structure, is painted red, with *Kiutoan* on her sides, and exhibits a light, at an elevation of 34 feet (10m4), from a tower amidships.

Three lights are exhibited from grey iron columns, surmounted by black frustrum daymarks, standing on concrete bases on Sheng tan: the south-eastern of these, known as Sheng tan Lower caisson light, is situated about 5½ miles eastward of Nanhui beacon, and is exhibited at an elevation of 33 feet (10m1); Sheng tan Middle caisson light (*Lat. 31° 07′ N., Long. 121° 44′ E.*) is situated about 3¾ miles north-eastward of Nanhui beacon, and is exhibited at an elevation of 38 feet (11m6); Sheng tan Upper caisson light is situated nearly 4¾ miles north-north-eastward of Nanhui beacon, and is exhibited at an elevation of 33 feet (10m1).

Middle ground buoy, about 7½ miles north-north-westward of Sheng tan Upper caisson light-structure, is a light-buoy, marked "2", painted red, and exhibiting a white occulting light *every eight seconds*. light *four seconds*.

Heng-sha, the south-easternmost of the islands lying on the north-eastern side of South channel, is an alluvial island intersected by many creeks. A framework tower, about 60 feet (18m3) in height, surmounted by a pole with a conical daymark, stands near the southern extremity of the island; this beacon is for surveying purposes only. Yuan-yuan-sha, about 3 miles west-north-westward of Heng-sha, is surrounded by a mud flat which dries.

South-east Knoll buoy, off the north-western extremity of Yuan-yuan-sha, is a light-buoy, painted red, exhibiting a *white occulting* light *every eight seconds*.

Kiutoan Small beacon light is exhibited, at an elevation of 40 feet (12m2), from a white mast on a dwelling, situated on the south-western shore of the channel westward of Yuan-yuan-sha.

Ya-wo-sha, about 2 miles north-westward of Yuan-yuan-sha, is surrounded by an embankment and is inhabited; a drying flat extends about 5 miles eastward from the island. A framework tower, about 50 feet (15m2) in height, surmounted by a pole with a spherical daymark, stands on the southern side of Ya-wo-sha; this beacon is for surveying purposes only.

Blockhouse buoy, about 4 miles west-north-westward of the beacon on Ya-wo-sha, is a light-buoy, marked "4", painted red, and exhibiting a *white occulting* light *every eight seconds*, light *four seconds*.

Yung-ting-sha, Chung-pao-sha, and Shih-tou-sha lie on the drying flat extending about 6½ miles west-north-westward from Ya-wo-sha. A framework tower, about 53 feet (16m2) in height, surmounted by a pole with a cylindrical daymark, stands on the eastern extremity of Shih-tou-sha; this beacon is for surveying purposes only.

Quarantine buoy, about 2½ miles north-westward of Point beacon, is a light-buoy, marked "5", painted red, and exhibiting a *white occulting* light *every eight seconds*, light *four seconds*.

Submerged masonry, named Ying-fu-shih, extends fully half a mile offshore in places for two miles south-eastward of Point beacon.

Charts 1199, 2412, 1262.

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Chart 1602.

Anchorage.—Vessels may anchor above the Quarantine buoy and clear of the fairway into the Whangpoo. Vessels arriving from infected ports can anchor here for the purpose of inspection by the Health officer. The anchorage is covered by the *green* sector of Woosung light between the bearings of 199° and 242°. Vessels proceeding to this anchorage, and passing northward of the Quarantine buoy, must exercise extreme caution, as, in 1936, the shoal along the southern side of Chung-pao-sha had extended southward.

North-westward of Quarantine buoy the flood stream attains a rate of 2½ knots, and the ebb stream 4 knots.

Measured distance.—Three pairs of iron beacons, each surmounted by a triangle, and painted black and white in horizontal bands, are erected near Kiutoan Small beacon (*Lat. 31° 19′ N., Long. 121° 39′ E.*). The first pair are situated nearly 2 miles south-eastward of Kiutoan Small beacon; the middle pair are 2 miles north-westward of the first pair and close northward of Kiutoan Small beacon; the third pair are one mile north-westward of the middle pair. The measured distance is 3 miles long and the course is 304° or 124°.

Compass adjustment.—Three beacons, consisting of masts painted black and white in horizontal bands, each surmounted by a triangle, are erected on the western end of Chung-pao-sha. The two front beacons are 45 feet (13^{m}7) in height, with the triangles point up; the rear beacon is 60 feet (18^{m}3) in height, with the triangle point down. The rear beacon in line with the southern front beacon bears 356° 13′, and in line with the western front beacon bears 086° 21′; the two front beacons are in line bearing 321° 57′.

North channel.—Buoy.—Shaweishan, with its light, has been described on page 294. Shaweishan buoy, about 5¼ miles west-south-westward of Shaweishan, is a red can buoy.

Drinkwater point, the south-eastern extremity of Tsungming island, is low, covered with grass and reeds, and protected by embankments. A framework beacon, 60 feet (18^{m}3) in height, surmounted by a pole and daymark, stands on Drinkwater point; this beacon is for surveying purposes only.

North-west beacon stands on the south coast of Tsungming island, about 17½ miles west-north-westward of Drinkwater point beacon, and between them are Liu chiao beacon, Dumb beacon, and Two Trees beacon; the latter is a mast with a spherical daymark, and the other two are framework structures, each surmounted by a pole and daymark. All these beacons are for surveying purposes only.

Tsungming crossing, about 3 miles north-westward of Shih-tou-sha, was formerly used by vessels proceeding from North channel to the main channel of the Yangtze kiang.

As North channel was closed to navigation in 1931, no further description of it will be given.

Charts 1124, 1602.

Directions.—Owing to the constant changes taking place in the estuary of the Yangtze kiang, local knowledge is essential for entering the river, and directions will only be given to enable vessels to make the Yangtze entrance light-vessel.

From the southward.—Full-powered steam vessels bound for the Yangtze kiang should steer for Steep island pass (page 250), and pass through it in about mid-channel, steering about 337°, so as to meet

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Charts 1124, 1602.

another vessel nearly end on. In thick weather, with the land obscured, it is advisable to anchor when some distance from Steep island by the reckoning, notwithstanding the fog signal there; good anchorage can be obtained in a depth of about 20 fathoms (36m6), mud, but the tidal streams are very strong, and when anchoring the vessel should be brought head on.

From Steep island course should be shaped to pass about one mile eastward of Elgar island (page 281), and thence proceed through Bonham strait (page 285); when past Pan yang shan (page 284) a north-north-westerly course may be steered for the Yangtze entrance light-vessel, when the pilot should be taken on board, passing from 5 to 6 miles eastward of Ta chi shan (page 283).

In thick weather, when Ta chi shan (*Lat. 30° 49′ N., 122° 10′ E.*) cannot be seen from a reasonable distance, it is best to anchor, taking care to keep out of the fairway; it is then not safe to attempt to make the Yangtze kiang, as the tidal streams are rotatory and strong, and neither their rate nor direction can be relied on with accuracy. Vessels not exceeding 21 feet (6m4) in draught can anchor south-westward of Ta chi shan; those of greater draught can anchor northward of Pei ting hsin (page 286).

Charts 1429, 1199.

Steam vessels of low power may, during summer, follow the route just given for vessels of full power; during winter, when northerly winds prevail, they can use the inshore passage westward of the Chusan archipelago (page 258). If their draught does not exceed 20 feet (6m1) they can enter this passage through Nu pi shan channel (page 233), and then take one of the three passes of the Futo channel (page 259); vessels exceeding this draught should pass outside Chiu shan lieh tao (page 234) and thence pass through Hea chi mum (page 242), which is the easiest to navigate of the various channels between the islands southward of Chu san. The route for both light and deep draught vessels then leads past Roundabout island (page 261), through Tower hill channel (page 262), Blackwall channel (page 262), and Hsihou men (page 263); thence westward of Yu hsing nao (page 258), southward and eastward of Chi chu lieh tao (page 282), and thence steer for the Yangtze entrance light-vessel, passing eastward of Ta chi shan.

Chart 1602.

From the northward.—Steam vessels approaching the Yangtze kiang from the northward or north-eastward make Shaweishan (page 294) and Amherst rocks; if thick weather prevents either of these being seen from a reasonable distance, vessels should anchor outside. Care must be taken to avoid being set on to Tungsha banks, which are hard.

Chart 1601, plan of the Whangpoo.

THE WHANGPOO.—The Whangpoo, a portion of which forms the Port of Shanghai, can be entered by any vessel whose draught permits of the passage through the South channel. A Conservancy Board is charged with the improvement and control of this river.

There are no pilots in attendance at the entrance to the Whangpoo, and application for a pilot should be made to the Pilot office at Shanghai.

Charts 2809, 1199, 2412, 1262.

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Chart 1601, plan of the Whangpoo.

In 1936 the largest vessel proceeding regularly to Shanghai was the R.M.S. *Empress of Canada*, of 36,032 tons, length 644 feet (196m3), breadth 83½ feet (25m4), draught 28 feet (8m3). In 1935 the s.s. *Philocteles*, with a draught of 31 feet (9m4), left the port without mishap.

Chart 1601, plan of Woosung bar.

Entrance to the Whangpoo.—The entrance to the Whangpoo lies between Lan kiang wai sha, which extends about three-quarters of a mile from the southern side to a depth of 18 feet (5m5), and Woosung spit, which extends about 6 cables eastward from the northern side and dries. Training walls, marked by beacons, are constructed on the drying flats on the south-eastern side of the entrance; the north-western side is formed by a training wall, which uncovers about 9 feet (2m7) and is marked by beacons, extending along the southern edge of Woosung spit.

Both shores are low, cultivated, and intersected by numerous canals; they are protected by embankments from freshets. The Quarantine station is situated on the north-western side of the entrance.

Yun tsao pang enters the western side of the river about one mile west-south-westward of the inner end of the northern training wall; Woosung village is situated on the northern side of the creek and contains some godowns and whitewashed buildings. The railway from Shanghai terminates near Woosung lighthouse.

Lights.—Light-buoys.—A light is exhibited, at an elevation of 26 feet (7m9), from a black framework beacon on the eastern extremity of the northern training wall (*Lat. 31° 24′ N., Long. 121° 31′ E.*).

A light is exhibited, at an elevation of 50 feet (15m2), from a black square tower, 58 feet (17m7) in height, at Woosung. A light is exhibited, at an elevation of 30 feet (9m1), from a white steel framework tower, with a white circular daymark, situated on the sea wall about three-quarters of a cable east-north-eastward of Woosung lighthouse. These two lights in line, bearing 250°, lead through the deep-water channel between the training walls.

Lismore buoy, about 3½ cables east-south-eastward of the eastern extremity of the northern training wall, is a light-buoy, surmounted by a sphere, the whole painted black, exhibiting a *white occulting* light *every eight seconds*, light *four seconds*. Fort buoy, about 2½ cables east-south-eastward of Woosung lighthouse, is a light-buoy, painted black, exhibiting a *white occulting* light *every eight seconds*, light *four seconds*.

Woosung anchorage.—The lower limit of Woosung anchorage is a line drawn 132° from Woosung lighthouse, and the upper limit is a line drawn 118° from a position on the western bank 8 cables above the lighthouse; *see* Harbour regulations for the Port of Shanghai, clauses 1 to 5, on page 302. Vessels at anchor here are liable to drag, and they are, therefore, advised to moor; a spare anchor should be ready to let go, as the water comes in rushes at spring tides. Vessels intending to anchor should enter the river against the tidal stream.

Storm signals of the China Seas Storm Signal Code are exhibited from a signal station near Woosung lighthouse; *see* page 27.

At Woosung the ebb stream begins from 1½ to 2 hours after high water at spring tides, and from 1¾ to 2½ hours after high water at neap tides; the flood stream begins from 20 to 40 minutes after low

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Chart 1601, plan of Woosung bar.

water at spring tides, and from one to 1½ hours after low water at neap tides. The tidal streams make on both banks before they begin in mid-channel.

Tide indicator.—Tide signal.—A tide indicator, consisting of a vertical skeleton dial 30 feet (9m1) in diameter, is erected on the tide-gauge station situated on the training wall about 3½ cables north-eastward of Woosung lighthouse. The black numerals 0 to 18, each 3½ feet (1m1) in height, with black 3-foot (0m9) radial lines beneath them, are set around 280° of the outer portion of the dial; the remaining sector of 80° at the base is blank. At the centre of the dial is a black pointer, 10½ feet (3m2) long, to indicate the height of the tide in feet above the chart datum; in the blank space below the centre is a 7-foot (2m1) black arrow head, which points upwards when the tide is rising and downwards when it is falling. At night, the numerals 0, 5, 10, 15, the pointer and the arrow head are outlined by Neon lights; the remaining figures are indicated by spot lights. The dial faces the entrance to the Whangpoo from seaward.

A black ball by day, or a *white* light at night, is exhibited during the rising tide from a mast, 15 feet (4m6) in height, surmounting the tide indicator.

The river.—Buoys and beacons.—Pei chiang tsui is situated on the eastern side of the Whangpoo and south-eastward of the entrance to Yun tsao pang; a drying mud flat extends nearly 1½ cables from the point. The Quarantine hospital and Sanitary station are situated here.

Woosung creek buoy, about midway between the entrance to Yun tsao pang and Pei chiang tsui, is a light-buoy, painted black, exhibiting a *white occulting* light. The period of this light, and all the other light-buoys in the Whangpoo, is the same, namely: a light of *four seconds* duration every *eight seconds*.

About three-quarters of a mile south-south-eastward of Pei chiang tsui is the north-western end of Kao chiao sha; this island was formerly separated from the mainland by the Old Ship channel, which has now been closed by a training wall extending across the entrance and along the south-western side of the island to Kao chiao chiang, about 3 miles south-eastward. The Harbour master's office, with a flagstaff, is situated on the western bank of the river, about one mile above the entrance to Yun tsao pang.

Chart 1601, plan of the Whangpoo.

Astrea channel lies along the south-western side of Kao chiao sha. Kao chiao tan (Astrea flats) extends for about 1½ miles along the south-western side of the river opposite Kao chiao chiang; training walls are constructed along this bank of the river. Astrea channel is marked by five light-buoys, numbered consecutively from seaward, marked "I", "II", "III", etc., in white. No. I light-buoy is moored on the north-eastern side of the channel, about 3¾ cables east-south-eastward of the Harbour master's flagstaff (*Lat. 31° 21′ N., Long. 121° 30′ E.*), and is painted black and exhibits a *red occulting* light. Nos. II, III, IV, and V light-buoys mark the south-western side of the channel, and are painted red and exhibit *white occulting* lights; No. II light-buoy is moored nearly 1¾ miles south-eastward of the Harbour master's flagstaff, and No. V light-buoy is moored about a quarter of a mile southward of the entrance to Kao chiao chiang. Seven mooring

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Chart 1601, plan of the Whangpoo.

buoys, for the use of Preventive and Conservancy vessels, are laid on the north-eastern side of the channel, within a distance of half a mile south-eastward of Astrea channel light-buoy No. I; these buoys are lighted at night when unoccupied.

Two submarine power cables cross the river about 8 and 10 cables, respectively, southward of Kao chiao chiang; the landing places of each cable are marked by notice boards inscribed "Cable crossing." About 1½ miles southward of Kao chiao chiang, and on the western bank of the river, is the entrance to Chiu chiang, a narrow creek. Tung kou buoy, moored off the entrance to this creek, is a light-buoy, painted red, exhibiting a *white occulting* light. Chen chia tsui is on the eastern side of the river, opposite Chiu chiang.

Tung kou tan, a portion of which is under reclamation, extends from the western bank of the river between the entrance to Chiu chiang and Chou tsia tsui, nearly 2 miles southward.

Chart 389.

SHANGHAI HARBOUR.—Lights.—Light-buoy.—Shanghai harbour is that part of the Whangpoo situated between Tung kou, a creek on the eastern shore nearly one mile above Chen chia tsui, and Kiangnan arsenal, a distance of nearly 9 miles by the river; it is under the control of the Harbour master, who is appointed by the Conservancy board. The width of the harbour varies from about 1½ to 2½ cables, and the depths from 20 to 60 feet (6^{m}1 to 18^{m}3). Almost all vessels in the harbour are berthed at wharves, but some lie in the stream, secured head and stern to buoys. The harbour is crowded with all kinds of native craft, from large five-masted junks to sampans.

A light is exhibited, at an elevation of 20 feet (6^{m}1), from a steel framework tower on a concrete dolphin, 20 feet (6^{m}1) in height, on the northern entrance point of Tung kou.

A light is exhibited, at an elevation of 17 feet (5^{m}2), from a steel framework tower, 15 feet (4^{m}6) in height, on the northern end of Nee Tai Shing Coal Company's wharf, situated on the eastern bank of the river in the upper section of the harbour.

A conical light-buoy, painted black, exhibiting a *red* fixed light, is moored off Pootung point, and marks the outer edge of the shoal, with depths of less than 3 fathoms (5^{m}5), which extends nearly half way across the river from that point.

Berths.—Shanghai harbour is divided into sections numbered down stream from I to XI, and in addition there are the Upper sections A, B, and C, and a Lower section; the positions of these sections are best seen on the chart. All berths in the stream within the sections are between head and stern mooring buoys.

In the Upper section B there are six berths, the mooring buoys for them being numbered 6 to 12 up stream.

In Sections II and III are five buoys, providing one berth each for warships of Japan, United States, France, and Great Britain, respectively.

In the lower reach, below Pootung point (*Lat. 31° 14′ N., Long. 121° 29′ E.*), the first berth commences in Section VI between Nos. 1 and 2 mooring buoys, and the last berth ends in the Lower section between Nos. 43 and 44 buoys; the intermediate buoys are numbered consecutively down stream. The three lowest berths, between buoys Nos. 41 to 44, are for vessels laden with dangerous goods.

Charts 1601, 1602, 2809, 1199, 2412, 1262.

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Chart 389.

A *red fixed* light is exhibited from the end buoy, when vacant, of each tier of mooring buoys; the remainder of the buoys, when vacant, exhibit a *white fixed* light.

Signals for swinging berths.—The special local signals described here are to be exhibited by vessels intending to swing at the berths at the mooring buoys in the stream, which are designated as "Swinging berths". These signals are to be exhibited at the masthead or where they are most clearly visible. In thick weather, when the visibility is bad, vessels should give an additional signal of five short blasts on their whistle.

No. IX section: by day, the answering pendant above a black ball; at night, one *red* light above two *white* lights disposed vertically.

No. V section: by day, a black ball above the answering pendant; at night, two *white* lights, disposed vertically, above one *red* light.

No. I, Upper A, and all other sections except IX and V: by day, a black ball; at night, a *red* light above a *white* light.

The above signals are to be exhibited by vessels when proceeding to and swinging in the berths, and are to remain hoisted until the swinging manœuvre is completed.

During daylight, if the swinging berths in sections IX and V are occupied by a vessel carrying out the swinging manœuvre, the signal station of the Custom's depot at Pootung point will hoist the same signal as that required for the vessel swinging.

When a signal indicates that a swinging berth is occupied by a vessel swinging, then all other vessels shall keep clear of that berth until the signal has been hauled down.

Prohibited anchorage.—Anchorage is prohibited in the upper reach of the harbour between the Kiangnan dock buoy and 1¾ cables southward of the China National Aviation Corporation's aerodrome at Lunghua, as shown by pecked lines on the chart.

Charts 1601, 389.

Harbour regulations for the Port of Shanghai.—The following are extracts from the Harbour regulations for the Port of Shanghai:—

1.—The term "vessel" in these regulations refers to vessels of foreign type.

2.—The anchorages at Woosung for vessels are:—

(*a*) For vessels other than those provided for in (*b*): from Woosung lighthouse to Yun tsao pang, or outside the entrance.

(*b*) For vessels proceeding to Shanghai which are not lightening: for vessels with explosives as cargo on board, and for vessels under quarantine restrictions, outside the entrance.

3.—A vessel anchored outside Woosung bar shall be clear of the fairway leading to the entrance of the river, and in this respect must conform to the directions of the Berthing officer.

4.—A vessel requiring to anchor in anchorage (*a*) shall, on arriving off the entrance to the Whangpoo, display flag "N" of the International Code of Signals at the fore, when she will be boarded by the Berthing officer, who will direct her to a proper berth.

5.—Vessels in anchorage (*a*) shall moor in accordance with the instructions received from the Berthing officer.

Charts 1602, 2809, 1199, 2412, 1262.

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Charts 1601, 389.

6.—The anchorages for vessels in Shanghai harbour are :—

(*a*) For vessels other than those provided for in (*b*), (*c*), (*d*), and (*e*) : from the south side of the Kiangnan Arsenal dock to the Standard Vacuum Oil Company's wharf.

(*b*) For vessels carrying explosives : outside Woosung, as provided for in Clause 20.

(*c*) For vessels carrying mineral oil, turpentine, spirits of wine, arrack, etc. : below Section VIII, on the Pootung side, as provided for in Clause 28.

(*d*) For vessels carrying benzine, naphtha, and other high inflammables : below the Cosmopolitan dock, as provided for in Clause 29.

(*e*) For quarantine purposes : outside Woosung, as provided for in Clause 33.

7.—Vessels entering the harbour will be boarded by a Berthing officer, who will direct them to proper berths.

8.—River coast, and mail steamers which have determined berths are allowed to proceed to them without stoppage except as provided in Clauses 20, 28, 29, and 33 of these Regulations.

9 —Five buoys, with four berths, are moored above Pootung point and abreast the Storm signal station (*Lat. 31° 14′ N., Long. 121° 29′ E.*) and are reserved for the use of men-of-war.

10.—Vessels shall moor in accordance with instructions received from the Harbour master, and shall not shift their berths without a special permit, except when outward-bound after having obtained their clearance papers.

11.—Applications for berths or for permission to shift must be made at the Harbour master's office by the shipmaster, the first officer, or the pilot in charge, when the necessary instructions concerning the berth will be given.

12.—Vessels are required to conform with the "International Regulations for Preventing Collisions at Sea."

14.—Between Yung tsao pang and Kao chiao chiang no steam vessel shall overtake and pass another steam vessel, except a tug or a tug towing.

15.—No steam vessel or other large vessel shall, except for the purpose of avoiding an accident, anchor between Yung tsao pang and the Standard Vacuum Oil Company's wharf.

16.—Vessels when passing Conservancy works in course of construction or Conservancy craft engaged in dredging, etc., shall proceed at a slow speed.

17.—Vessels under way above the lower end of the Standard Oil Company's wharf shall proceed at no greater speed than is necessary to keep the vessel under control.

18.—When vessels are shifting from wharves to head-and-stern mooring buoys, or *vice versa*, and when swinging at wharves, a black ball, 4 feet ($1^{m}2$) in diameter, must be displayed at the flagstaff on the wharf from which the vessel is shifting, or at which swinging, and no vessel shall commence to shift or to swing until such black ball has been displayed for 10 minutes. The vessel whilst so shifting or swinging shall display a black ball, 2 feet ($0^{m}6$) in diameter, at the fore.

20.—Vessels having on board as cargo any high explosives, or the

Charts 1602, 2809, 1199, 2412, 1262.

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Charts 1601, 389.

specially prepared constituents of such, shall anchor outside Woosung and display a red flag at the fore, and, in regard to the discharge of same, they shall abide by the instructions received from the Customs.

28.—Vessels arriving with mineral oil, turpentine, spirits of wine, or arrack as cargo shall be berthed on the Pootung side of the river below Section VIII of the harbour, or alongside a Tungkadu wharf, or the Namnatow wharf, southward of Tungkadu dock, and must remain there until all such cargo has been discharged.

29.—Vessels arriving with naptha, benzine, ether, or other high inflammables as cargo, shall not proceed above the Cosmopolitan dock (*Lat. 31° 16′ N., Long. 121° 33′ E.*)

33.—Vessels arriving from an infected port, or having any infectious disease on board or any disease suspected to be infectious, and vessels on board which a death has occured during the voyage from her last port, shall, as provided by the Quarantine regulations for the port, on approaching Woosung, display the Quarantine flag at the fore, anchor outside the entrance to the Whangpoo, and keep the flag displayed until pratique has been granted.

37.—No refuse is to be thrown into the river. Vessels wishing to discharge ashes or other refuse should display flag Y of the International Code of Signals at the fore, when a licensed ash-boat will attend.

40.—The blowing of steam whistles or sirens, except for the purpose of signalling in accordance with the "Regulations for Preventing Collisions at Sea," or for the purpose of warning vessels of dangers, is strictly forbidden.

42.—No vessels, except men-of-war, may use swinging booms; these, if used, must be rigged in from sunset to sunrise.

Note.—The lights to be carried by small local vessels and native craft, within the limits of the port, are given in the Local Regulations.

Quarantine regulations.—For the Quarantine regulations for Shanghai and other ports in China, *see* page 47.

Port signals.—A list of the call flags to be used by vessels requiring a doctor, water-boat, etc., is given on page 40.

Tidal streams.—At Shanghai the flood stream runs from about 2¾ hours before until 2¾ hours after high water, and the ebb stream from about 2¾ hours after high water until 2¾ hours before the next high water; both streams attain a rate of from 3 to 4 knots at spring tides. After rains the ebb stream occasionally runs for 8 hours, and may attain a rate of 4½ knots.

Directions.—Except with local knowledge, vessels should not enter the Whangpoo without a pilot; the tide indicator at Woosung (page 300) should be consulted so as to obtain the depths at the time in the entrance and in Astrea channel. Vessels are recommended not to proceed up the river with the tide, as it is very dangerous to do so, especially during spring tides. A vessel of deep draught should arrive off the entrance to the Whangpoo just before the time of high water, and should proceed up the river when the tide indicator denotes that the water has started to fall.

The leading lights at Woosung, in line bearing 250°, leads between the training walls in a least depth of 29 feet (8m8), in 1930, and northward of Lismore light-buoy. Thence a vessel should hold the western bank of the river at a distance of about two-thirds of a cable until.

Charts 1602, 2809, 1199, 2412, 1262.

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Charts 1601, 389.

abreast the Harbour master's office, situated about one mile above Yun tsao pang, passing westward of Fort and Woosung creek light-buoys; the fairway through Woosung anchorage (page 299) is eastward of the vessels moored there, and it is not advisable to enter whilst they are swung across the channel.

In proceeding up Astrea channel, from abreast the Harbour master's office (*Lat. 31° 21′ N., Long. 121° 30′ E.*) vessels should steer to pass nearly one cable southward of Astrea channel No. I. buoy, then a cable northward of No. II. buoy, nearly the same distance northward of No. III. buoy, and about three-quarters of a cable eastward of Nos. IV. and V. buoys. Vessels of deep draught can now proceed up the river considerably after the time of high water, and by regulating the speed after passing the south-eastern end of Kao chiao sha, can arrive at Shanghai on the ebb.

Between Astrea channel and No. 11 mooring buoy (in Section IX, nearly 1¾ miles below Pootung point) the greatest depths are near the eastern and southern sides of the river, passing eastward of Tung kou buoy; in Section IX, however, vessels must cross to the northern side of the river between Nos. 10 and 11 mooring buoys, and continue along this side so as to pass northward of Nos. 1 to 10 mooring buoys in Sections VI, VII, and VIII.

Great attention to the helm is necessary when rounding Pootung point; the channel here is narrowed by a shoal bank extending nearly half-way across the river just below the point, and marked by a light-buoy, painted black. It would be extremely dangerous to take this bend with the tidal stream, especially at spring tides, as under these conditions there is great danger of being set on to vessels lying at the British Naval Buoys.

Chart 389.

Shanghai.—Shanghai is the most important centre of foreign trade in China; as it is the nearest seaport to the great city of Soochow, situated on the Grand canal about 37 miles west-north-westward, it has always been a considerable place of trade, but after it was opened to foreign commerce in 1842 it gradually rose from a third-class city to one of the chief commercial emporia in the world. The name signifies "upon the sea", and although it is now 10 miles from the coast, Chinese annals state that it was once on the seashore, and that the low land which now intervenes has been formed by alluvial deposits. For 50 miles around the city there is water communication with the interior in every direction by the numerous canals and creeks which intersect the province.

The native city, which is surrounded by walls, is situated on the western bank a short distance above the bend in the river at Pootung point. The French settlement lies westward and northward of the native city, and also extends along the river as far as the creek which leads to the East gate; the noteworthy buildings in this settlement are the Consulate, the town hall, and the Roman Catholic cathedral. The British settlement is between the French settlement and Soochow ho, a creek spanned by several bridges; the British Consulate, a large square building with a long façade, stands near the southern bank of this creek.

All along the British bund are many fine buildings and some public gardens; in the middle of the bund are the Imperial Maritime Customs

Charts 1602, 2809, 1199, 2412, 1262.

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Chart 389.

house, which is surmounted by a high clock tower, and the Harbour master's office. The International settlement extends about one mile up the northern bank of Soochow ho and along the river side northeastward; it contains the other foreign Consulates and the offices of many of the leading mercantile firms. On the Pootung side of the river are the wharves and warehouses of various shipping companies, engineering and shipbuilding works, and industrial buildings; the depôt of the Imperial Maritime Customs and a signal station are situated on Pootung point (*Lat. 31° 14′ N., Long. 121° 29′ E.*).

In 1930 the population of the International Settlement and the French Settlement was 1,455,588, including 48,806 foreigners.

Shipping.—In 1935, 5,625 steam vessels, with an aggregate of 14,554,057 tons, entered the Port of Shanghai.

Harbour facilities.—Large stocks of coal are available; there are depths of from 22 to 28 feet (6^{m}7 to 8^{m}5) at the wharves, and coaling can also be carried out from lighters at the rate of from 600 to 800 tons per day. Large quantities of fuel oil are stocked, and can be taken in from wharves or lighters.

Fresh provisions are plentiful; water can be taken in alongside or in the stream from water boats.

There are several dry docks at Shanghai. The Cosmopolitan dock, situated about 3½ miles below Pootung point, is the largest of these, the details of which are given in Appendix I. There are several other docks varying from 584 feet (178^{m}0) to 342 feet (152^{m}4) in length.

Repairs of all kinds can be executed, and there are sheers capable of lifting from 25 to 80 tons.

There is rail communication with Woosung, Hangchow, and Nanking. There is steamer communication with all parts of the world. Shanghai is connected with the general telegraph system.

Storm signals.—Storm signals of the China Seas Storm Signal Code are made at the Storm signal station near the French Consulate; *see* page 27.

Supplementary storm signals (*see* page 33) are exhibited on the flagstaff of the Custom house in Section IV of the port, at the Custom house on the western side of the entrance to the Yangtzepoo, Section X, and at the mast on the water tower at Ping an dock, in the Upper Section.

Simultaneously with the exhibition of the Supplementary storm signals denoting the approach of a typhoon or strong gale, a gun will be fired three times in succession, by day or night, at the Storm signal station near the French Consulate, in Section III, and at the Custom house in Section X of the port.

Daily weather signals.—At 0930 a signal is made by flags of the International Code of Signals from the Storm signal station indicating the direction and force of the wind at Ta chi shan (page 283) at 0900. The direction is given by the flags N, E, S, W, whilst flag V denotes variable, and flag U denotes calm; the force is given by the numeral pendants of the same code. The signal is lowered at 1000; in case of delay the signal will be displayed from 1130 to 1150.

At 1530 signals similar to those displayed in the forenoon will indicate the direction and force of the wind prevailing at Ta chi shan at 1500. Should delay occur the signal will be displayed from 1620 to 1640.

Charts 1601, 1602, 2809, 1199, 2412, 1262.

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Chart 389.

At 1700 weather forecasts are given for the night and the morrow as follows:—

A red square flag.—Signals under this flag indicate the probable direction and force of the wind within the next 24 hours on the coast southward of the Chusan archipelago.

A blue square flag:—Signals under this flag indicate the probable direction and force of the wind within the next 24 hours on the coast northward of the Chusan archipelago.

A burgee with blue, white, and red vertical stripes.—Indicates that the weather at Shanghai is likely to remain fine within the next 24 hours.

A burgee with blue and red vertical stripes.—Indicates the weather will be unsettled during the next 24 hours.

A burgee with red and blue horizontal bands.—Indicates a probability of bad weather during the next 24 hours.

A blue triangular flag.—Indicates a fog at sea in the neighbourhood of Ta chi shan.

Information as to meteorological conditions in the China seas is shown in diagram form at the Storm Signal station, and the Zikawei observatory can be consulted from the Storm signal station by telephone if fuller particulars are required.

Barometer signals.—At 1600 signals are made by the numeral pendants of the International Code of Signals from the Storm signal station, indicating the height of the barometer at Zikawei observatory reduced to 32° Fahr. and to sea level. Only three pendants are used at each hoist, the initial figure being omitted, thus:—024—30·24; 994—29·94; 879—28·79. This affords a means of comparing barometers with a standard.

Health.—There is cholera in the native city every summer, and partial outbreaks have occured at intervals in recent years in the foreign settlements, but the majority of the foreigners' cases were among the merchant ships in the harbour.

Malarial fevers exist; dysentery and diarrhœa are prevalent, and are apt to become chronic during spring and autumn on account of the sudden changes of temperature, with an atmosphere usually laden with moisture.

Seamen visiting the port should wear flannel belts round the belly and avoid chills; they should eschew the use of unripe or over-ripe fruit, native-made aerated waters, and ice, except machine-made from good water.

Smallpox may be considered endemic amongst the Chinese during autumn and winter, and visitors should be re-vaccinated, if that operation has not been recently performed. Sunstroke is frequent during the very hot weather, which generally begins in the second week of July and ends in the second week of September; during this period no man should be allowed to go out in the sun who is suffering from even mild fever, or who has consumed much intoxicating liquor.

Enteric fever is common in autumn. Venereal diseases are very prevalent.

Generally, a healthy, temperate European or American, who adopts ordinary and proper precautions, has nothing to fear from the climate of Shanghai. For Meteorological table, *see* Appendix III.

Charts 1601, 1602, 2809, 1199, 2412, 1262.

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Chart 1622.

The Whangpoo above Shanghai.—In 1862 the Whangpoo was ascended for about 27 miles above Shanghai by a vessel with a draught of 20 feet (6^{m}1), which moored in a depth of 16 fathoms (29^{m}3) off the entrance to a creek leading to the city of Sungkiang.

Chart 3522.

YANGTZE KIANG.—The Yangtze kiang, over 3,000 miles long and traversing six provinces, is one of the four largest rivers in the world; it is the great artery of China, constituting one of the chief elements in the developments of her commerce. The river from the sea to Hankow is known as the Lower Yangtze; between Hankow and Ichang, the Middle Yangtze; and above Ichang, the Upper Yangtze.

For information concerning this river, *see* Yangtze kiang Pilot, and the Chinese Maritime Customs publication "Handbook for the Guidance of Shipmasters on the Ichang-Chungking section of the Yangtze river."

Charts 2809, 1199, 2412, 1262.

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CHAPTER VIII.

TUNG HAI AND HWANG HAI.—THE COAST OF CHINA FROM THE YANGTZE KIANG TO CHEFOO.

Charts 3480, 2412.

TUNG HAI AND HWANG HAI.—Tung hai or Eastern sea lies between the east coast of China, and Nansei shotō and Kyū shū; it extends northward from Formosa to a line joining the mouth of the Yangtze kiang and the south-western extremity of Korea. The climate in this area is temperate. Gales are of common occurrence, with occasional typhoons, and snowstorms in winter; the summer is fine. The currents, beyond the influence of the Yangtze kiang and the coastal tidal streams, seem to be irregular, except in the eastern part, through which the Kuro shio or Japan stream sets north-eastward and northward.

Hwang hai or Yellow sea lies northward of Tung hai, and between the coast of China from the Yangtze kiang to Shantung promontory and the coast of Korea.

Chart 3480.

Banks and rocks.—Great Yangtze bank, with general depths of less than 20 fathoms (36^{m}6), extends from the estuary of the Yangtze kiang to a position about 125 miles east-north-eastward of Shaweishan.

Socotra rock (*Lat. 32° 07′ N., Long. 125° 11′ E.*), about 154 miles east-north-eastward of Shaweishan, is a small coral patch over volcanic rock, with a depth of not more than 3 fathoms (5^{m}5) over it. There are depths of from 27 to 30 fathoms (49^{m}4 to 54^{m}9) within a quarter of a mile of the rock, except on the south-western side, where a rocky ledge, with a least depth of 17 fathoms (31^{m}1), extends half a mile. The tidal streams set strongly over the rock, and there are overfalls and tide rips, whilst the sea sometimes breaks over it; with a favourable light the greenish colour of the water may be seen, but only from a short distance.

A depth of 11 fathoms (20^{m}1) was obtained by the s.s. *Le Bruix*, in 1907, about 24 miles southward of Socotra rock, and a depth of 17 fathoms (31^{m}1) by H.M.S. *Alacrity*, in 1902, about 26 miles east-south-eastward of this rock.

Hyūga shō, about 111 miles north-north-westward of Socotra rock, is described on page 424.

A bank, with a depth of 14 fathoms (25^{m}6) over it, was reported, in 1928, in approximate Lat. 35° 10′ N., Long. 122° 31′ E.; this bank has not been examined.

Chart 1262.

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Chart 3480.

COAST.—Off-lying dangers.—The coast of China from the north entrance of the Yangtze kiang to Tao lin point or Tao ning che, about 225 miles north-westward, is low and is intersected by numerous streams. The whole of this coast is fronted by extensive flats and shoals, some of which extend about 60 miles from the coast; this area has not been surveyed, and it must, therefore, be avoided. The outermost banks are Wunan sha, Lankia sha, Chinkia sha, Hwantsi sha, Hotsio sha, Manszi sha, and Lang sha. Ta sha (Great sands) and Wu tiau sha lie off the entrance to Hwang ho kao (Old Yellow river), which flows out about 50 miles south-eastward of Tao lin point; junks are said to ground frequently on the former.

In 1922 a Japanese steamer struck a shoal of hard mud, with a depth of less than 6 feet (1m8) over it, about 59 miles northward of Shaweishan island and afterwards sank; this shoal is marked "P.A." on the charts. Vessels are warned to exercise caution when navigating in this locality, as reports indicate the probable existence of further shoals.

Vessels with a draught not exceeding 24 feet (7m3) can take a direct route from a position in Lat. 32° 00′ N., Long. 122° 30′ E. to Chalien tao (page 314), a distance of about 248 miles north-north-westward, taking care that they are not set westward of this track. A 3½-fathom (5m9) patch was reported, in 1911, by the German vessel *Luchs*, about 9 miles westward of this track, and a 5-fathom (9m1) patch was reported by the s.s. *Grays Harbor*, in 1931, about 18 miles eastward of the track; both these patches lie eastward of the mouth of the Hwang ho kao. In 1934, H.M.S. *Bridgewater* steered 118° from Lat. 34° 42′ N., Long. 120° 25′ E. to Lat. 34° 16 N., Long. 121° 23′ E., approximately parallel to the north-eastern edge of Ta sha and Wu tiau sha, and obtained regular soundings of from 9½ to 12 fathoms (17m4 to 21m9).

Kai shan (Kwan shan), an island about 150 feet (45m7) high, lies about 2½ miles off the mouth of the Kuan ho, which flows out about 25 miles south-eastward of Tao lin point; this river is navigable for small vessels up to Hsiang shui k'ou, about 22 miles south-westward of the entrance.

The Lieh tse ho flows out about 9 miles north-westward of the Kuan ho, and is navigable for small vessels up to a distance of about 4 miles within its entrance.

Tidal streams.—The tidal streams off the banks northward of the entrance to the Yangtze kiang, and eastward to about the meridian of 124° E., are rotatory, and their directions and rates are shown by tidal arrows on chart 3480; the tidal streams are, however, considerably influenced by the prevailing winds, and a rate of 4½ knots has been observed at spring tides after a long period of strong north-easterly winds.

Lien yun kang.—Tunghsilien tao (Monli shan) is a bare, rocky island with a conspicuous sharp summit, situated about 1½ miles northward of Tao lin point, and an artificial harbour, named Lien yun kang, has been constructed in the channel between. This harbour lies between two wharves, about 2½ cables in length and parallel to each other, extending in an east-north-easterly direction from the mainland; the eastern wharf is prolonged for approximately a further half mile by a breakwater. The space between these two wharves

Chart 2412, 1262.

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Chart 3480.

forms the harbour, and is about one cable wide. There are three berths for vessels alongside the inner side of each wharf; the eastern is the coaling wharf, and the western is for other cargo. In 1936 it was reported that there were depths of from 16 to 18 feet (4m9 to 5m5) alongside the coaling wharf; the depths in the harbour were about 18 feet (5m5). An approach channel, which appears to have depths of from 20 to 36 feet (6m1 to 11m0), has been dredged close along the southern side of Tunghsilien tao, and in 1935 it was reported that a vessel with a draught of 25 feet (7m6) could enter the harbour at high water. The mud bottom is too soft to afford good holding ground.

A conspicuous white tower stands at the root of the eastern wharf, and close eastward of this tower is a signal station, from which the entry and departure of vessels is controlled.

Lien yun kang is the terminus of the Lung hai railway, which passes through Haichow.

Light.—Light-vessel.—Buoys and beacons.—A light is exhibited, at an elevation of 128 feet (39m0), from a red iron framework tower, 16 feet (4m8) in height, situated on the eastern foot of Yinyu shan, a hill on the eastern extremity of Tunghsilien tao. In 1936 a light was exhibited on the head of the eastern breakwater.

A whistle-buoy, painted in red and black horizontal bands, is moored about 1½ miles eastward of the light-structure on Tunghsilien tao.

In 1936 a converted junk, painted red with "Lien Yuen Harbour" in white on the side, was moored at the entrance to the dredged channel leading to the harbour. This vessel had one mast with a black ball, and exhibited a light. In the same year two red cask buoys marked the northern side of the channel, one being moored off Tunghsilien tao and the other close off the breakwater.

Two leading beacons mark the centre line of the dredged channel leading to the harbour; the front beacon is a white triangular board, apex up, and the rear beacon is a similar board, apex down. These beacons are in line bearing 263°.

Directions.—The directions given hereafter were used in 1936, but it must be distinctly understood that the approach channel, and its marking, may have been altered subsequently, and that these directions were merely found to be serviceable at the time.

In clear weather the first objects to be sighted, when approaching from the eastward, are the high land of the mainland and the summit of Tunghsilien tao; the latter should be steered for bearing 265°, and at a distance of about 12 miles the white tower at the root of the eastern wharf, and subsequently the signal station, will be sighted. The signal station should then be steered for, bearing 250°, until the entrance light-vessel is sighted; pass the light-vessel close on the port hand with a course of 263°, when the leading beacons will be seen in line on that bearing. Care must be taken to keep exactly on the leading line, as the dredged channel is narrow, and the set of the tidal streams is strong and variable. The channel leads about 2 cables off the nearest point of Tunghsilien tao. When the breakwater is reached vessels can turn into the harbour as convenient, taking care not to proceed too far westward. During the east-going tidal stream there is a strong set on to the head of the breakwater.

Charts 2412, 1262.

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Chart 3480.

Berthing is carried out by the Railway company, four tugs being employed; vessels are always swung before berthing. Vessels must remain outside until instructed to enter the harbour by signal.

Haichow bay.—Haichow bay is entered between Tunghsilien tao and Observation point, about 20 miles northward; the bend on the southern side of the bay rises to mountains nearly 2,000 feet (609^{m}6) high, but the higher peaks are frequently obscured by clouds. Bamboo islet lies about a quarter of a mile off the southern shore of the bay and 5 miles west-north-westward of Lien yun kang; westward of this islet the bay is shoal. Nainai shan, an islet 150 feet (45^{m}7) high, lies about 6½ miles north-westward of Bamboo islet, and is connected to the western shore of the bay by a stone causeway. The Lin hung ho flows out in the south-western corner of the bay, and is navigable for small vessels as far as Tapu, about 8 miles above the entrance, where there are some wharves; there are salt-pans on the eastern side of the entrance. There is considerable native traffic on this river, as Tapu is on the Lung hai railway.

Haichow, a walled city, is situated on the Lin hung ho about 4 miles south-westward of Tapu, and stands on an alluvial plain at the foot of a short, irregular range of hills, the highest peak of which is about 1,500 feet (457^{m}2) high. Frost and slight falls of snow are experienced in the vicinity of Haichow bay in the winter, but the rivers do not usually freeze; the months of July and August are very hot and oppressive.

Off-lying islets.—Light.—Cheniu tao (Tsin shang), about 22 miles north-eastward of Tunghsilien tao, is the northernmost of a group of five islets and rocks. A light is exhibited, at an elevation of 237 feet (72^{m}2), from a white steel circular tower, 27 feet (8^{m}2) in height, with a white dwelling, situated on the summit of Cheniu tao (*Lat. 34° 58′ N., Long. 119° 53′ E.*).

Tanien tao (Ping tau), with a rugged top and steep sides, is charted about 4 miles east-north-eastward of Cheniu tao. Ping tao (Tsha shan) lies about 7 miles northward of Tanien tao; a reef, with rocks above water on it, extends about half a cable from the western extremity of Ping tao, and a small islet, with a reef extending eastward from it, lies about one cable off the eastern extremity. Tanien tao and Ping tao were reported, by the s.s. *Kashing* in 1916, and by H.M.S. *Folkstone* in 1936, to be situated about 8 miles south-south-eastward of their charted positions.

The above islets are frequently enveloped in fog during spring and early summer.

Coast.—Light.—Dangers.—Fengtoa shan, a hill about 1,000 feet (304^{m}8) high, is situated about 2½ miles northward of Observation point; thence to Pearl cape, about 48 miles northward of Observation point, the land is low and undulating, with some isolated ranges of hills. In the bight between Observation point and a point about 17 miles north-north-eastward there are depths of less than 5½ fathoms (10^{m}1) within a distance of about 5 miles offshore in places, and numerous fishing nets may be encountered farther out.

Tower point, about 21 miles north-north-eastward of Observation point, is low and rocky; a reef extends about one mile from its southern side. About 4 miles south-westward of Tower point are some earth cliffs, which lie under a sharp hill with a tower on its eastern spur.

Charts 2412, 1262.

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Chart 3480.

Sichia so is a small town close north-westward of Tower point. A light, privately maintained, is exhibited, at an elevation of 74 feet (22m6), from a white concrete tower, with its upper parts painted black, surmounted by a flagstaff, situated on Tower point.

About 6 miles northward of Tower point is an isolated hill, 787 feet (239m9) high, terminating eastward in a bluff which forms the southern entrance point of Wangkiatai wan, a shallow bay with low rocky shores fringed by reefs; this bay has not been surveyed. Small vessels with local knowledge can obtain shelter in this bay from northerly and north-easterly winds, in depths of from 3 to 5 fathoms (5m5 to 9m1), mud.

Langyi tao, an island lying off a point about midway between the northern entrance point of Wangkiatai wan and Pearl cape, terminates southward in a bluff about 230 feet (70m1) high; the low northern part of the island is said to be connected with the mainland by a spit. There is a shallow, sandy bay on the western side of Pearl cape.

Chart 1255.

Tachu shan is a rugged range extending about 5 miles north-westward from Pearl cape, and terminates in a summit about 1,600 feet (487m7) high.

Lingshan tao (Telo san), an island about 8 miles east-north-eastward of Pearl cape, is precipitous near its southern end, whence it slopes towards its northern extremity, off which is a small rock above water.

Charts 857, 1255.

KIAOCHOW BAY AND APPROACH.—Southern side of approach.—Kaiser point is situated about 6 miles northward of the northern extremity of Lingshan tao, and is the eastern entrance point of Arkona inlet; Laoling shih, a rock 3 feet (0m9) high, lies about 3 cables southward of the point. The greater part of Arkona inlet dries, but a narrow channel, with depths of from 2¾ to 4 fathoms (5m0 to 7m3), runs from the entrance to the middle of the inlet, and affords anchorage to small vessels with local knowledge, not exceeding 13 feet (4m0) in draught, sheltered from all except southerly winds. A rock, which dries 3 feet (0m9), lies in the middle of the entrance, and another rock lies on the eastern side, just within the entrance. There is an islet on the western side of the entrance, and Niu tao, another islet, lies on the drying bank on the western side of the channel and nearly in the middle of the inlet. Ling shan wei, about a mile inland from the western shore of Arkona inlet, is a place of considerable commercial importance.

The coast between Kaiser point and Pile point, about 10 miles north-eastward, is the south-eastern side of Haishi peninsula, and is rocky; the southern part of this peninsula, which forms the eastern side of Arkona inlet, is about 300 feet (91m4) high, the northern part is also hilly, whilst the middle part is low and sandy. Liensan tao is a group of rocks above water lying on a reef which extends about half a mile from Irene point, situated nearly 1½ miles north-eastward of Kaiser point. Princess rocks, about 3 miles east-north-eastward of Kaiser point, are two rocks which dry 7 feet (2m1); a rock, with a depth of 5 fathoms (9m1) over it, lies about one mile eastward of Princess rocks. Arkona point is situated about 5 miles north-eastward of Kaiser point, and is fringed by reefs to a distance of about 2 cables.

Chart 1262.

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Chart 1255.

Islets and dangers.—Lights, buoys and beacon.—Chalien tao (*Lat. 35° 54′ N., Long. 120° 52′ E.*) lies about 34 miles eastward of Kaiser point and has a small hill in the middle; rocks above water lie within a quarter of a mile south-eastward of its eastern extremity, and foul ground extends about 2 cables from its south-west point. In spring and early summer dense fog hangs about the islets, even when the coast is quite clear, and caution should be observed when approaching them, especially at spring tides, when the tidal streams are strong.

A light is exhibited, at an elevation of 262 feet (79^{m}9), from a white octagonal stone tower, 42 feet (12^{m}8) in height, on the summit of Chalien tao. A fog signal is sounded from this light-station.

Chart 857.

Hsiaokung (Siaukung) tao, about 15 miles west-north-westward of Chalien tao, is a rocky islet 133 feet (40^{m}5) high. A light is exhibited, at an elevation of 171 feet (52^{m}1), from a white iron framework tower, 38 feet (11^{m}6) in height, on the summit of Hsiaokung tao; a fog signal is sounded from the lighthouse. In 1935, fishing stakes were reported to extend north-eastward from Hsiaokung tao to Ka ti niau (page 324).

Taikung tao lies about 4½ miles south-westward of Hsiaokung tao, and from all directions resembles a haycock; Tupfen islet lies about 4 cables west-north-westward of Taikung tao, and a rock, which dries 13 feet (4^{m}0), lies close off its north-west point. In May, 1935, H.M.S. *Berwick* passed between Taikung tao and Hsiaokung tao and observed fishing nets, stakes and buoys, which appeared to occupy the whole channel. A light is exhibited, at an elevation of 424 feet (129^{m}2), from a black circular iron tower, 25 feet (7^{m}6) in height, on the summit of Taikung tao; a fog signal is sounded from the lighthouse.

Taikung tao reef, about 1¼ miles westward of Taikung tao, dries 11 feet (3^{m}4). A square iron framework beacon, 17 feet (5^{m}2) in height, painted red and black in horizontal bands, and surmounted by a white cylinder, stands on the reef.

Chucha tao, about 3¾ miles southward of Pile point, has a flat summit and is inhabited. Pinliu tao lies about 2 cables off its eastern side and is connected to it by a partly drying reef; Lien tao are two islets lying about 2 and 3 cables, respectively, eastward of Pinliu tao.

Haishi shoal, about 1¼ miles westward of the north point of Chucha tao, has a least depth of 1¼ fathoms (2^{m}3) over it. A black buoy, No. 9, surmounted by a staff, is moored off the north-western side of this shoal.

Tachiao tao, about 2½ miles north-north-eastward of the north point of Chucha tao, is a rock which dries 12 feet (3^{m}7). A light is exhibited, at an elevation of 47 feet (14^{m}3), from an iron framework tower, painted red and black in horizontal bands, on Tachiao tao. Haishi reef, about one mile south-westward of Tachiao tao, has two heads, which dry 7 and 9 feet (2^{m}1 and 2^{m}7), respectively.

Swallow bank has several patches on it with depths of 5 fathoms (9^{m}1) and less; the shoalest patch, with a depth of 3¾ fathoms (6^{m}9), lies about 1¾ miles eastward of Tachiao tao. The north-western side of the bank is marked by a black buoy, No. 11, surmounted by a staff; it has been reported that this buoy is not conspicuous. The summit

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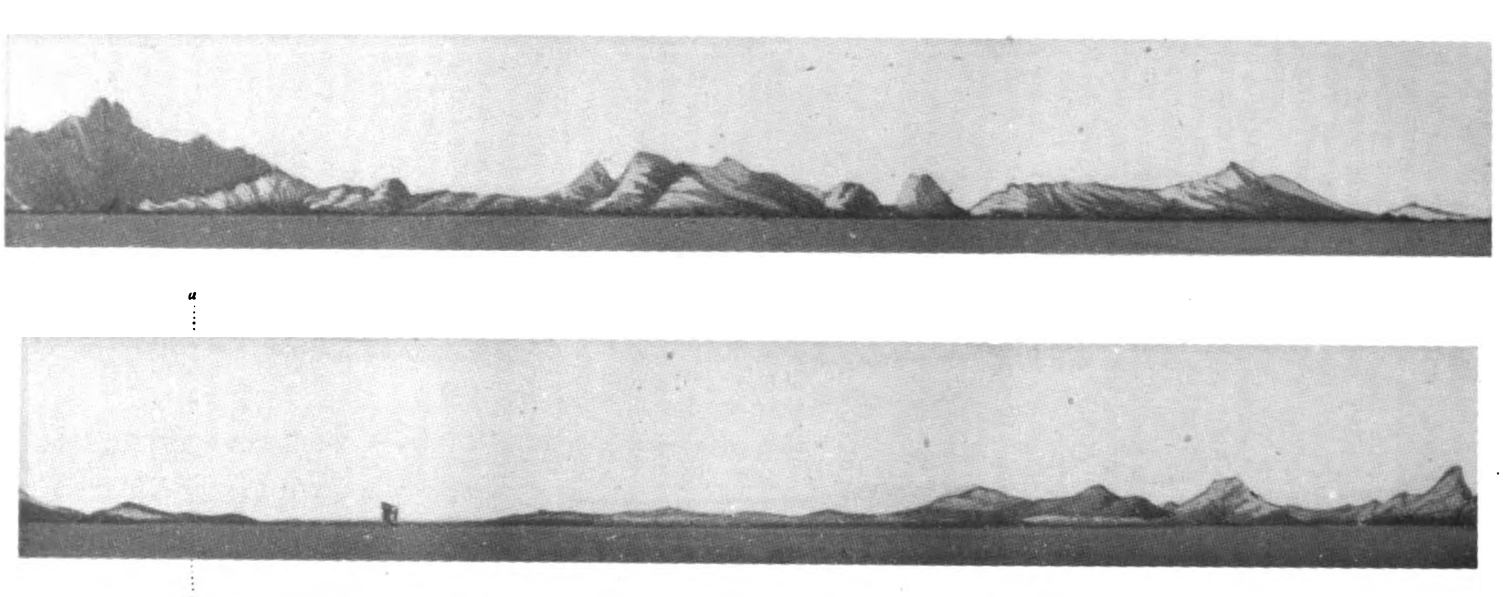
To face page 315.



View, in two parts, of Kiaochow bay approach: Mark for clearing Swallow bank.
(Original dated 1866).

Southern coast of Shantung peninsula.

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Chart 857.

of Chiposan (page 322) in line with Pile point, bearing 302°, leads southward of Swallow bank and northward of Tachiao tao ; *see* view facing this page. Si shan (page 320) in line with Cape Evelyn, situated about three-quarters of a mile west-north-westward of Pile point, bearing 280°, leads northward of Swallow bank ; *see* view on chart 857.

Chart 3735.

Northern side of approach.—Coast.—The northern side of the approach to Kiaochow bay is formed by a high promontory, the south-eastern extremity of which, named Yatau kiao, lies about 10½ miles north-eastward of Hsiaokung tao. Yatau kiao (*Lat. 36° 08′ N., Long. 120° 43′ E.*) is a vertical cliff about 300 feet (91^{m}4) high, and rises to a sharp hill, 741 feet (225^{m}9) high, which is perpendicular on its southern side. Within Yatau kiao the land rises to a range of rugged limestone mountains, the highest peak of which, named Loting, lies about 5 miles north-westward of this cape. The depths off Yatau kiao are very irregular ; the tidal streams sometimes attain a rate of 2 knots, and there is a strong tide race.

Charts 857, 3735.

The coast between Yatau kiao and Nanyan peninsula, about 5½ miles west-south-westward, is bold, rugged, and steep-to, except the shore of a bay immediately north-eastward of the peninsula, which is sandy. Steep island lies nearly three-quarters of a mile south-eastward of the south-east point of Nanyan peninsula ; foul ground, with some rocks which dry, extends about 2 cables north-westward from the island.

Chart 857.

Laoshan harbour.—Directions.—Fu tao, an island 282 feet (85^{m}9) high, is separated from the south-western extremity of Nanyan peninsula by a channel barely 1½ cables wide, with a least depth of 5 fathoms (9^{m}1) in the fairway. A shoal, with depths of less than 3 fathoms (5^{m}5), extends about half a mile westward from Fu tao, and Little Fu tao, an islet 30 feet (9^{m}1) high, lies on this shoal. Red rock, 30 feet (9^{m}1) high, lies about half a mile southward of Fu tao, with a deep channel between.

The main entrance to Laoshan harbour is between Fu tao and Fort point, nearly 1½ miles westward ; a reef, which partly dries, extends nearly half a mile south-eastward from Fort point. The depths in the entrance are from 3½ to 5 fathoms (6^{m}4 to 9^{m}1), but northward of the shoal extending from the western side of Fu tao is an area with depths of from 6 to 13 fathoms (11^{m}0 to 23^{m}8). The harbour affords good and secure anchorage. Middle point, with a hill on it, 269 feet (82^{m}0) high, is situated at the head of the harbour and divides it into two inner bays. Tengyau bay, the eastern of the two, dries over the greater portion. Shasiko bay, the western, has depths of less than 3 fathoms (5^{m}5) ; the small village of Shasiko is situated on a stream which flows into the head of this bay and can only be entered by boats at high water. Yen tai ting (Horn hill), about 1½ miles north-westward of Fort point, has a conspicuous sharp summit.

The harbour can be entered with he eastern extremity of Middle point bearing 019° ; when Steep island opens northward of Fu tao course should be altered eastward, anchoring in a depth of 5 fathoms (9^{m}1), with Red rock bearing about 146°, just open westward of Fu tao, and the summit of steep island bearing 091° and seen between Fu

Charts 1255, 3480, 1262.

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Chart 857.

tao and Nanyan peninsula. Vessels can also anchor farther eastward, in the deep area previously mentioned; junks anchor northward of this deep area, in depths of from 2 to 3 fathoms (3m7 to 5m5), good holding ground. The harbour can also be entered by the channel between Fu tao and Nanyan peninsula, but the tidal streams in it are probably rapid at spring tides.

Coast.—Islets and dangers.—Immediately westward of Fort point is a small cove which affords anchorage for junks; a reef, which partly dries, extends about half a mile south-eastward from its western entrance point. The large village of Chiang ko chuang is situated about a quarter of a mile up a river, which is often dry, flowing into the head of the cove.

About 2½ miles westward of Fort point (*Lat. 36° 06′ N., Long. 120° 32′ E.*) is a bluff point, from which foul ground, with depths of less than 3 fathoms (5m5), extends about a quarter of a mile southward; a detached rock, with a depth of 3 fathoms (5m5) over it, lies about 4 cables south-south-westward of the bluff point. Chuensisan, an islet 18 feet (5m5) high, surrounded by a reef, lies nearly 2 miles south-westward of the bluff point. The land behind this point is hilly, the highest peak being Kaiserstuhl, situated nearly 1½ miles northward of it.

Mai tao, an island about 1¾ miles south-westward of Chuensisan, lies close to the coast and is connected to it by a ridge which dries. About midway between Mai tao and Iltis peninsula, about 3½ miles westward, is a point 73 feet (22m3) high; Fushan so bay is entered between this point and Iltis peninsula, and Fushan so is a town near its northern shore.

North shoal consists of several patches, with depths of from 3½ to 5 fathoms (6m4 to 9m1), lying within a distance of one mile south-eastward of Iltis peninsula. A 3¾-fathom (6m9) patch and a 4¼-fathom (8m7) patch lie about 1½ miles and 2½ miles, respectively, east-south-eastward of Iltis peninsula.

KIAOCHOW BAY.—Kiaochow bay, entered between Pile point and Iltis peninsula, is partially frozen over during severe winters, which set in about the beginning of December and end about March, but the ice is never thick enough to obstruct large vessels, although it may occasionally inconvenience small vessels and junks. The entrance is deep, as is also the southern part of the bay, but the north-western and northern parts are encumbered with extensive shoals and flats.

The general aspect of the land about the bay is barren, and the dry, parched soil, which is yellowish clay interspersed with occasional blocks of granite, has an uninviting appearance. *See* view facing page 315. Several streams flow into the bay, but none of them is navigable.

Outer harbour.—The outer harbour lies immediately within the entrance to Kiaochow bay, and extends westward to a line joining Cape Evelyn and Yunui san, situated about 1¾ miles northward. The Outer harbour has moderate depths, soft mud and sand, affording good holding ground. With southerly winds, which are frequent in summer, a sea gets up; this, however, does not occur in winter, when northerly winds prevail.

The northern side of the Outer harbour is indented by four small bays. Iltis bay, the easternmost of these, is entered between Iltis

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Chart 857.

peninsula and Hui chuen point, about one mile westward; its shores are fringed by reefs, which extend nearly 1½ cables offshore in places.

Augusta Victoria bay is entered between Hui chuen point and a point nearly three-quarters of a mile north-westward; it has depths of less than 3 fathoms (5m5) over its greater part, and a flat which dries occupies the head of the bay. A rock, with a depth of 3½ fathoms (6m4) over it, lies about 4 cables south-westward of Hui chuen point.

Tsing tao bay, immediately westward of Augusta Victoria bay, has depths of less than 3 fathoms (5m5), and a portion at the head of the bay dries. Reefs, which partly dry, extend nearly 4 cables from the western entrance point of the bay. Tsing tao (Arkona islet) (*Lat. 36° 03′ N., Long. 120° 19′ E.*) lies about 2 cables westward of the eastern entrance point, with foul ground between, and protects the eastern part of the bay from southerly winds. A concrete pier extends about 2 cables in a south-south-easterly direction from the northern shore of the bay; landing can be effected at steps on either side, the outer ones having a depth of about 7 feet (2m1) alongside.

The western side of the bay immediately westward of Tsing tao bay is formed by an island connected to the mainland by a reef, on which is a narrow causeway; the south-western extremity of this island is a hillock named Yunui san, 42 feet (12m8) high. An islet lies about one cable south-eastward of the south-east point of this island, and is connected to it by a reef which dries. Shoal water extends about 1½ cables southward from the islet and from Yunui san.

Lights.—Buoyage.—A light is exhibited, at an elevation of 101 feet (30m5), from a white octagonal stone tower, 51 feet (15m5) in height, on Tsing tao. Lights are exhibited on the head of the pier in Tsing tao bay.

A light is exhibited, at an elevation of 82 feet (25m0), from an octagonal brick tower, 50 feet (15m2) in height, painted black and white in horizontal bands, on Yunui san. A fog signal is sounded from the lighthouse.

A light-and-whistle-buoy, No. 12, painted red, and exhibiting a *white flashing* light *every three seconds*, is moored about three-quarters of a mile south-south-eastward of Tsing tao.

A red conical buoy with a staff, No. 10, is moored off the southern extremity of the reefs extending from the western entrance point of Tsing tao bay.

A red bell-buoy, No. 8, is moored about 3 cables south-eastward of Yunui san.

All the buoys in Kiaochow bay and approach are withdrawn from December to February, inclusive, owing to drift ice.

Quarantine anchorage.—The Quarantine anchorage is southward and south-westward of Tsing tao, within the area marked by pecked lines on the chart; a red spar buoy is moored on the eastern limit of this anchorage and about 4½ cables south-south-eastward of Tsing tao. *See* Articles 36 and 37 of Harbour regulations on page 322.

Submarine cable.—A telegraph cable is laid eastward of No. 12 light-and-whistle-buoy and eastward of Tsing tao; the landing place is close eastward of the pier in Tsing tao bay. Anchorage is probihited in the vicinity of this cable.

Inner harbour.—The Inner harbour lies immediately westward of the Outer harbour, and extends north-eastward within the limits

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Chart 857.

indicated by pecked lines on the chart. Haishi wan, on the southern side of the Inner harbour, is entered between Cape Evelyn and a point nearly 2 miles west-south-westward, and is divided into two parts by a wedge-shaped promontory. Haishi wan has depths of less than 3 fathoms (5^{m}5), and the head dries; Junk rock lies about one mile south-eastward of the western entrance point of the bay, and dries 12 feet (3^{m}7).

The northern part of the Inner harbour is sheltered from southerly winds by Tsing tao promontory, which terminates south-westward in Yunui san; north-easterly winds raise a nasty sea, which frequently makes boatwork impossible. About three-quarters of a mile northward of Yunui san is a hill 74 feet (22^{m}6) high.

Dangers.—Light.—Buoyage.—Bay rock lies nearly 2 miles south-westward of Yunui san, and dries 2 feet (0^{m}6); a black spar buoy, No. III., is moored about 2 cables north-eastward of this rock.

Middle ground, a shoal with a depth of 3¼ fathoms (5^{m}9) over it, lies nearly 2 miles north-westward of Yunui san; a black spar buoy, No. 7, is moored off its eastern side.

Chart 857, plan of Tsingtao Inner harbour.

Horseshoe rock is a large rocky shoal, which dries in parts, lying with its southern extremity about 1¾ miles northward of Yunui san (*Lat. 36° 03′ N., Long. 120° 17′ E.*) and about 4 cables offshore. A light is exhibited, at an elevation of 40 feet (12^{m}2), from a circular tower, 36 feet (11^{m}0) in height, painted black and white in horizontal bands, on the north-western part of Horseshoe rock. The south-eastern edge of Horseshoe rock is marked by a spar buoy, No. II., painted black and white in horizontal bands; the north-western extremity is marked by a light-buoy, No. 6, painted red, and exhibiting a *white flashing* light *every three seconds*; the north-eastern extremity is marked by a conical spar buoy, No. 1, painted red and white in horizontal bands.

The main channel to Commercial harbour leads westward and northward of Horseshoe rock, and is marked by the following buoys:—

On the western and northern sides: a black conical buoy, No. 5, moored about three-quarters of a mile westward of Horseshoe rock lighthouse; a black conical buoy, No. 3, moored about 6 cables north-westward of the above lighthouse and on the eastern edge of a flat with depths of less than 5 fathoms (9^{m}1); a black conical buoy, No. 1, moored about 9 cables north-eastward of the same lighthouse. On the southern side: a red conical buoy, No. 4, moored nearly half a mile north-north-eastward of Horseshoe rock lighthouse; a red conical buoy, No. 2, moored about three-quarters of a mile north-eastward of this lighthouse.

There is also a narrow channel, with a least depth of about 4 fathoms (7^{m}3) in the fairway, south-eastward of Horseshoe rock. The north-western side of this channel is marked by No. II. buoy, previously described; the south-eastern side is formed by a bank, with depths of less than 3 fathoms (5^{m}5), extending about 3½ cables from the coast south-eastward of Horseshoe rock, and on this bank is Barkass rock, marked by a granite pillar, 20 feet (6^{m}1) in height, painted black and white in horizontal bands and surmounted by a cylinder. Tapao tao is a rock on the eastern side of this channel and about 7 cables east-north-eastward of Horseshoe rock lighthouse; it dries 5 feet

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Chart 857, plan of Tsingtao Inner Harbour.

(1m5), and is marked by a pyramidal beacon, 30 feet (9m1) in height, painted black and white in horizontal bands and surmounted by a white cylinder. A rock, with a depth of less than 6 feet (1m8) over it, lies about half a cable north-north-westward of Tapao tao.

Anchorage.—There is anchorage either north-eastward or south-westward of Horseshoe rock.

In 1933, H.M.S. *Cornflower* anchored with Barkass rock beacon bearing 192°, distant half a mile. In October, 1935, H.M.S. *Kent* found secure anchorage with Tapao tao beacon bearing 112°, distant 7½ cables.

Boat harbour.—Lights.—A small harbour, protected by two breakwaters, has been constructed eastward of Horseshoe rock, and a portion of it has been dredged to a depth of about 14 feet (4m3). A pier, connected to the railway system, extends from the north-eastern side of this harbour, and there is a dry dock on the south-western side of the harbour; *see* Appendix I.

A light is exhibited, at an elevation of 19 feet (5m8), from a red iron framework structure, 13 feet (4m0) in height, on the head of the southern breakwater; a light is exhibited from a similar structure, 20 feet (6m1) in height, situated about one cable south-south-eastward of the above light. These two lights in line, bearing 161°, lead to the entrance of the harbour from the north-westward.

A light is exhibited, at an elevation of 19 feet (5m8), from a green iron framework structure, 13 feet (4m0) in height, on the head of the northern breakwater; a light is exhibited from a similar structure, 30 feet (9m1) in height, on a rock lying nearly 4½ cables north-eastward of the preceding light. These two lights in line, bearing 054°, lead to the entrance of the harbour through the channel south-eastward of Horseshoe rock.

Landing pier.—Lights.—A pier, known locally as the Back Bay Naval pier, extends from the coast about half a mile south-westward of the Boat harbour; this pier is for the use of boats from warships visiting the port, and there is a signal tower at its root.

Two lights are exhibited from the head of the pier, and there are two mooring buoys close off it.

Commercial harbour.—Lights.—The Commercial harbour is formed by a horseshoe-shaped breakwater extending from the coast about 1¼ miles north-eastward of the Boat harbour. The entrance lies between the extremity of this breakwater (*Lat. 36° 05′ N., Long. 120° 18′ E.*) and the extremity of No. 1 mole, which extends from the coast in a westerly direction; No. 2 mole lies about a cable north-eastward and parallel to No. 1 mole, and No. 3 mole is about a cable north-eastward and parallel to No. 2 mole. The moles are connected to the railway system. The outer portion of the harbour has been dredged to a depth of about 30 feet (9m1), and there are depths of from 21 to 28 feet (6m4 to 8m5) alongside the wharves. In 1936, it was stated that the depths in places in this harbour, and between it and Horseshoe rock, were less than those charted. There are some mooring buoys in Commercial harbour.

A light is exhibited, at an elevation of 21 feet (6m4), from a green iron framework structure, 14 feet (4m3) in height, on the extremity of the breakwater. A light is exhibited, at an elevation of 21 feet (6m4), from a similar structure on the head of No. 1 mole.

Charts 1255, 3480, 1262.

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Chart 857, plan of Tsingtao Inner Harbour.

A light is exhibited, at an elevation of 43 feet (13m1), from an orange coloured iron framework structure surmounted by a cage, 36 feet (11m0) in height, on the northern side of the head of No. 2 mole; a light is exhibited, at an elevation of 71 feet (21m6), from a similar structure, 66 feet (20m1) in height, situated about 6 cables east-north-eastward of the preceding light. These two lights in line, bearing 074°, lead through the channel between the flats into the entrance of Commercial harbour.

Berthing signals for the Commercial harbour are made from a signal station on the extremity of No. 1 mole; the berth is indicated by hoisting the mole number above the berth letter by flags of the International Code of Signals.

A red and white burgee hoisted by day, and a *white* light over a *red* light at night, denotes that a vessel may proceed into the Commercial harbour. A blue and white pendant by day, and a *white* light over a *green* light at night, denotes that a vessel may leave the harbour. Vessels must not enter or leave the harbour until the appropriate signal is hoisted.

Vessels bound for Commercial harbour must first anchor in the Quarantine anchorage in Tsing tao bay (page 317), where they will be boarded by the Health officer and pilot.

Chart 857, 1255.

Directions.—Vessels approaching Kiaochow bay from the southward should make Chalien tao (page 314), or its light at night, and then steer to pass north-eastward of Taikung tao and direct for the entrance. On approaching the bay, the rugged crest of Lung shan, situated about 1¾ miles northward of Mai tao, is conspicuous. Nubble hill, about 1½ miles northward of Iltis peninsula, has a cairn on its summit; about 4 cables westward of Nubble hill is a square granite pillar with a triangular top, standing on a hill 260 feet (79m2) high. **Tamo shan, on the southern side of Kiaochow bay and about 10 miles west-south-westward of Cape Evelyn, is very conspicuous, and shows a double summit on westerly bearings;** this range runs in a northerly direction for about 5 miles to Si shan.

The deep channel to Commercial harbour is westward and northward of Horseshoe rock, between the buoys described on page 318; a 150-ton crane, situated on the breakwater, is conspicuous when entering the harbour.

Tidal streams.—The tidal stream runs into the bay during the rising tide at a general rate of from one to 2 knots, although in the entrance a rate of from 3 to 4 knots is stated to have been experienced; the stream runs out of the bay when the tide is falling at about the same rate. The tidal streams turn regularly at about the times of high and low water.

Chart 857.

Town of Tsing tao.—The town of Tsing tao is situated on the promontory between Commercial harbour and Tsing tao bay, the residential quarter being on the shores of the latter, whilst the industrial quarter borders the north-western coast of the promontory. The two large chimneys of the electricity works, situated close southward of the Boat harbour, are conspicuous.

Harbour facilities.—Fresh provisions are plentiful; water can be obtained at the wharves and from water lighters. There are large

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Chart 857.

stocks of coal; vessels can take in coal alongside the wharves or from lighters. A small quantity of Diesel oil is available and can be shipped alongside the wharf.

There is a hospital at Tsing tao, and also a sailors' home.

There is railway communication with Tsinanfu, the capital of the Shantung province. Tsing tao is connected to the general telegraph system. There is regular steamer communication with Hong Kong, Shanghai, and Chefoo and also with Japan.

There is a signal station on Diedrichs hill (*Lat. 36° 04′ N., Long. 120° 19′ E.*), situated close eastward of the town. Storm signals are made from the Observatory, situated on the summit of a hill about a quarter of a mile north-westward of Diedrichs hill; *see* page 38. There is a W/T station at Tsing tao; *see* page 42.

Trade and shipping.—The principal exports are coal, salt, ground-nut oil, tobacco, eggs, and cattle; the imports are timber, cotton yarn, and sugar.

In 1935, 2,036 steam vessels with an aggregate of 3,648,595 tons, entered the harbour.

Harbour regulations.—The following are extracts from the Harbour regulations for the Municipality of Tsing tao:—

Art. 4.—In these regulations "vessels" shall be deemed to comprise men-of-war, steamers, and all other craft; "ships" comprise all ships, excluding men-of-war, whose gross tonnage exceeds 20 tons; "small craft" comprise all vessels of less than 20 tons.

Art. 6.—Vessels intending to enter or leave the Inner harbour between sunset and sunrise must apply for special night permission from the Harbour and Wharf Administration.

Art. 7.—All ships entering or leaving the harbour must hoist their national flag and their distinguishing signal in the International Code of Signals at the foremast.

Art. 9.—All ships entering the port must anchor in the Outer harbour, and may not enter the harbour or communicate with the land, or with other vessels, or land any passengers or crew or discharge any cargo until the ship has been boarded by an officer of the Harbour and Wharf Administration and until pratique has been granted.

Art. 10.—Ships intending to enter the Commercial harbour shall not proceed unless the signal flag "Go in" (white and red burgee) has been hoisted at the signal station by day, or at night a *white* light over a *red* light. In case the signal flag "Go out" (white and blue pennant) has been hoisted by day, or at night a *white* light over a *green* light is exhibited at the signal station, they shall wait outside the Commercial harbour clear of the fairway.

Art. 11.—Ships intending to leave the Commercial harbour shall not do so unless the signal flag "Go out" has been hoisted at the signal station by day, or at night a *white* light over a *green* light.

Art. 12.—When two or more ships are desirous of entering the Commercial harbour at the same time, they shall enter in the order indicated by the flags displayed at the signal station.

Art. 18.—All ships and small craft under way in the Commercial harbour must proceed slowly and shall not overtake other ships.

Art. 19.—Small craft must give way to men-of-war and ships under way in the Inner harbour.

Charts 1255, 3480, 1262.

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Chart 857.

Art. 34.—Ships arriving with explosives or dangerous inflammable articles, exceeding their ordinary requirements, shall hoist flag B of the International Code of Signals at the foremasthead by day, or exhibit a *red* light at night; they must anchor in the Outer harbour and await instructions from the Harbour Administration.

Art. 36.—Any ship entering the harbour shall, besides displaying the signals enumerated in Art. 7, also hoist the quarantine flag and anchor in the Outer harbour pending the arrival on board of the Port Medical Officer.

Art. 37.—Any ships or small craft entering the harbour having on board any of the following must, when at a distance of 5 miles from the harbour entrance, display the quarantine flag and await in the outer harbour the instructions of the Harbour and Wharf Administration.

(*a*) Cases or suspected cases of or deaths from any infectious or contagious diseases.

(*b*) Any such cases, suspected cases or deaths during the voyage.

(*c*) Arriving from any place or having had communication with any other vessel where such infectious or contagious diseases were prevalent, or having any other reason to suspect the existence of any infection or contagion.

Art. 41.—The discharge or the transhipment of cattle shall not be allowed unless a permit has been obtained from the Port Veterinary officer. The term "cattle" refers to cows, horses, donkeys, mules, goats, pigs, and dogs, etc.

Art. 47.—Besides these regulations, the ship or the craft shall abide by the "International Regulations for Preventing Collisions at Sea" and the "Port Quarantine Regulations."

Inner part of Kiaochow bay.—Shoals.—Buoys.—Hwangtao bay lies immediately westward of Haishi wan (page 318). A flat, which dries, extends nearly 2 miles from the western shore of the bay; Chiposan, an island with several villages on it, lies on the northern part of this flat.

Hwangtao shoal, with a least depth of 2¾ fathoms (5^{m}0) over it, lies about half a mile northward of the north point of Chiposan.

The north-western part of Kiaochow bay has no distinguishing features, and the almost level land, from about 70 to 180 feet (21^{m}3 to 54^{m}9) high, is fronted by extensive mud-flats, which dry out to as much as 3 miles offshore.

Ku shan (Gau shan) is a hill on the eastern shore of Kiaochow bay, and about 2 miles north-eastward of Commercial harbour; the Li-tsun ho flows out about 1¼ miles north-eastward of this hill, but a flat, which dries, extends from the shore off its mouth. Tunglau shan, about 8 miles north-eastward of Ku shan, is conspicuous, and its summit resembles a tower.

Yin tao lies on the mud-flat extending from the northern shore of Kiaochow bay; its highest part, near the middle of the island, is 194 feet (59^{m}1) high. A shoal, with depths of less than 3 fathoms (5^{m}5), extends about 5 miles southward from the south-eastern extremity of Yin tao; a red spar buoy, No. 14, is moored on the extremity of this shoal and about one mile west-north-westward of the light-structure on the breakwater of Commercial harbour. Tsangkoer deep, with depths of from 3 to 8 fathoms (5^{m}5 to 14^{m}6), runs in a northerly direction between this shoal and the flats extending from the

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Chart 857.

eastern shore of Kiaochow bay; the entrance lies between No. 14 buoy and a black spar buoy, No. 13 moored about half a mile west-north-westward of the light-structure on the breakwater of Commercial harbour.

Nukuko (*Lat. 36° 14′ N., Long. 120° 20′ E.*), situated in the north-eastern corner of Kiaochow bay and about 6½ miles northward of Ku shan, and Tsangkow, about midway between Ku shan and Nukuko, are the ports for junks trading with the city of Tsimo, situated about 10 miles up the Nan ho, which flows into the north-eastern part of Kiaochow bay.

Kiaochow (chart 1255), which was formerly the principal emporium in the eastern part of Shantung, is situated about 5 miles inland from the western shore of Kiaochow bay. Taputo, situated in the north-western corner of the bay, is the port for junks trading with this city; the port is reached by a narrow, intricate channel, named Ku ho, marked by buoys, and its upper part is only navigable at high water.

Chart 3735.

COAST.—Laoshan wan.—In Laoshan (Loshan) wan, which is entered between Yatau kiao (page 315) and Cape Adkins, about 16½ miles north-eastward, the depths are fairly regular, decreasing gradually towards the northern part of the bay. The western shore, between Yatau kiao and Village point, nearly 9 miles northward, is bold and rugged, and is indented with a few small sandy bays; Village point is the extremity of a small promontory about 150 feet (45m7) high. Wangkochuang kow, a small bay on the western side of this promontory, is filled with a flat which dries; on the north-western side of this bay is a headland 289 feet (88m1) high. Hsiau tao bay is entered between this headland and Centre head, about 3½ miles north-eastward; the head of this bay dries out to about three-quarters of a mile. Centre head has a double-topped hill on it, 502 feet (153m0) high, and about 1½ miles west-north-westward of this hill is a dome-shaped hill, 758 feet (231m0) high; Sugarloaf, a hill 858 feet (261m5) high, lies nearly 5½ miles west-north-westward of Centre head.

Great bay, forming the northern part of Laoshan wan, is entered between Centre head and Cape Adkins; its shores are comparatively low, but Chuangkou shan rises to an elevation of 853 feet (260m0) at the head of the bay. Boulder hill, at the south-western end of the promontory forming the eastern side of Great bay, is surmounted by granite boulders, which extend some distance down its sides, and it is a good landmark. The shores of Great bay are mostly fronted by mud and rocks, drying out as much as 2 miles in places.

Cape Adkins is cliffy, and has a hill on it 239 feet (72m8) high. A small islet, 85 feet (25m9) high, lies about half a mile north-north-eastward of the cape, and is connected to the coast by a shingle spit, which dries.

Islands and dangers in Laoshan wan.—A 4½-fathom (8m2) patch lies about 2½ miles northward of Yatau kiao and fully one mile offshore. Matterson island lies about 7½ miles north-eastward of Yatau kiao, and a reef lies about 1½ cables off its northern end. A rock, with a depth of less than 6 feet (1m8) over it, lies about half a mile south-westward of the south point of Matterson island, and about a quarter of a mile west-north-westward of this rock is a similar rock; both these rocks appear to break only in heavy weather.

Charts 1255, 3480, 1262.

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Chart 3735.

Ta tao lies about 2 miles westward of Matterson island ; its northern end is low and narrow. Ta tao rock lies about a quarter of a mile southward of Ta tao and dries. Nutsi tao lies about 1½ miles south-westward of Ta tao, and appears double from some directions. Shi-tsi tao consists of two islets lying together on a reef which dries ; the eastern and larger islet lies nearly 1½ miles westward of Ta tao. A rock, which dries, lies about 4 cables northward of the eastern islet.

Data rock (*Lat. 36° 15′ N., Long. 120° 42′ E.*), which dries, lies about 1¾ miles north-westward of Shitsi tao ; a rock, with a depth of 2½ fathoms (4m6) over it, lies about 6 cables north-north-westward of Data rock. Totsi tao lies about 1¼ miles northward of Data rock, and about a quarter of a mile farther northward is Hsiau tao, with a round summit. Neilson rock, awash, lies nearly one mile north-westward of Hsiau tao.

Adkins rock, about half a mile southward of Cape Adkins, is 6 feet (1m8) high ; Mau tao, about 1¼ miles westward of Adkins rock, is connected to the coast at the foot of Boulder hill by a stony ridge which dries ; this island is green in spring and brown in winter. Some rocks above water lie close off its south-western side. East reef lies about 2 miles west-south-westward of Mau tao, and is generally marked by breakers ; Cape Adkins bearing 063°, and open southward of Mau tao, leads southward of East reef. Star reef lies about one mile west-north-westward of Mau tao and dries ; there are three rocks above water near the middle of this reef, one of them being 18 feet (5m5) high. There is a safe passage, with a least depth of 5 fathoms (9m1), between Star reef and East reef. A rock awash lies about half a mile north-eastward of Star reef.

West reef lies about 2 miles northward of Centre head and about 6 cables off the western shore of Great bay. North reef lies in the middle of Great bay and about 4¼ miles north-north-eastward of Centre head, and is a large flat rock, which dries 12 feet (3m7).

Anchorage.—Great bay affords good shelter from north-easterly winds, in a depth of 5¼ fathoms (9m6), with the rocks on Star reef bearing about 333°, and the southern extremity of Mau tao bearing 086° ; Atkins rock will then be visible just open southward of Mau tao. The bottom, however, is very rocky, and the depths decrease rather suddenly northward of this position.

Small vessels can obtain good shelter, in a depth of 2¼ fathoms (4m1), about 3 cables north-north-westward of Star reef, which forms a good breakwater at low water ; at high water, however, an unpleasant sea sometimes sets in.

In Great bay, westward of Star reef, dangerous rollers set in with gales, and continue even after the wind has subsided, but these were not noticed along the coast in the southern part of Laoshan wan. During summer it is imprudent to anchor off this coast, as winds between east-north-east and south-east are frequent then, and at times blow hard, though rarely lasting more than 12 hours. In winter, winds between north-north-east and north-west prevail, chiefly in the latter quarter near the land, but in the former in the offing ; sometimes there are gales of short duration from the south-west, backing to south.

Outlying islands.—Ka ti niau lies about 11½ miles east-north-

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Chart 3735.

eastward of Yatau kiao, and a rock, 111 feet (33m8) high, lies close off its southern side. Nagata iwa, a rock awash, lies nearly half a mile north-north-eastward of the north point of Ka ti niau.

Ka ti niau, bearing 210°, 24 miles.
(Original prior to 1880).

Surveyor island, about 22 miles eastward of Ka ti niau, is divided into two portions by a narrow, perforated neck; the southern and higher part is 297 feet (90m5) high and very rugged. During spring the island is often obscured by fog, which is very prevalent in the offing, although it may be quite clear near the coast.

Coast.—Islets and dangers.—The coast between Cape Adkins (*Lat. 36° 23′ N., Long. 120° 53′ E.*) and South head, about 10½ miles north-north-eastward, is generally unapproachable on account of rocky and shoal ground, and is fronted by several islands and reefs. A smooth and somewhat flat-topped hill, 561 feet (171m0) high, is situated about 2½ miles north-north-eastward of Boulder hill, and between is a group of lower and very rugged hills covered with boulders. The land north-westward of these hills, across the isthmus which divides Great bay and Salt bay, is low and flat.

The southern entrance point of Salt bay lies about 2¾ miles north-north-eastward of Cape Adkins; a spit, which dries, extends about 1½ miles south-eastward from this point, and on it are Pang tou chuang and three other islets. Salt bay is filled by a mud flat, the greater portion of which dries. Chung tao lies off the entrance, and is undulating, with a hill 173 feet (52m8) high on its western part; a reef, which dries, lies about half a mile off the north coast of the island, and is connected to it by rocky ground, which also dries. End island, which is covered with grass, lies about 3 cables off the east point of Chung tao, with foul ground between. Che tao, another grassy island, lies nearly 1½ miles north-eastward of End island; its east coast and northern and southern extremities are low cliffs. A reef, with depths of not more than 3 fathoms (5m5), extends about 2 cables north-westward from the north point of the island. Che tao reef, about a quarter of a mile southward of Che tao, has depths of less than 3 fathoms (5m5) over it; on the middle of the reef is a rock 24 feet (7m3) high. A 3¾-fathom (6m9) patch lies about half a mile south-south-eastward of Che tao reef.

The promontory forming the northern side of Salt bay has a hill on it 266 feet (81m1) high, which shows a double summit from some directions. Temple hill, about 2 miles north-westward of this hill, has a joss-house on its summit; Kwan shan is a range of hills, the summit of which is 824 feet (251m2) high and is situated about 1¾ miles north-westward of Temple hill.

Tiger bay, immediately southward of South head, has depths of less than 3 fathoms (5m5), and a flat, which dries, extends as much

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Chart 3735.

as one mile from the head of the bay. San pin chuang is an island lying about 1¼ miles north-eastward of the southern entrance point of the bay; a reef, which dries, extends about a quarter of a mile from the east point of the island, and a reef, which partly dries, extends nearly one mile north-eastward from the southern entrance point of the bay.

Anchorage can be obtained, in depths of from 2¾ to 3¾ fathoms (5m0 to 6m9), between San pin chuang and Che tao, sheltered from south-westerly winds.

South head rises to a steep hill, 253 feet (77m1) high; this hill is the easternmost of a range of small hills lying northward of the sandy plain which lies at the base of Kwan shan, and from the southward it appears almost disconnected from the mainland. A bank, which dries over the inner part and has depths of less than 1½ fathoms (2m7) over the outer part, extends about 4½ miles east-south-eastward from South head, and forms the southern side of the entrance to the Tingtzetsui kow.

Tingtzetsui kow.—Tingtzetsui kow (Ting tsi river) is the mouth of a deeply penetrating inlet, mostly occupied by mud flats, which dry, and is entered between South head and a point about 3 miles north-eastward. Kinkiakow (Chin chia ko) is situated at the head of the inlet.

Bar islet (*Lat. 36° 32′ N., Long. 121° 03′ E.*), about 4 miles eastward of South head, has a round, grassy summit, and cliffy coasts fringed with rocks. Two patches of rocky ground, with depths of from three-quarters to one fathom (1m4 to 1m8), lie within a distance of 1½ miles south-eastward of Bar islet. Vanhear patch, about half a mile north-eastward of the islet, has a least depth of 4 feet (1m2) over it. A least depth of 1½ fathoms (2m3) can be carried over the bar, about 1½ miles southward of Bar islet; it is mainly sand, but there is rock in places. Within the bar there is a narrow channel with depths of from 3 to 8 fathoms (5m5 to 14m6).

A conspicuous hill, 517 feet (157m6) high, is situated on the southern side of the inlet and about 2½ miles westward of South head. Ruin hill is situated about 6 miles west-north-westward of South head. A hill, 292 feet (89m0) high, rises from the level land on the northern entrance point of the inlet; Triangle hill, about 4½ miles northward of South head, has a sharp summit.

Outer cape is the northern extremity of Pei shan peninsula, which extends about 1½ miles north-westward from South head. Ting tsi, an islet 102 feet (31m1) high, lies on the northern side of the channel and nearly one mile northward of Outer cape.

Coast.—The coast between the northern entrance point of Tingtzetsui kow and Low point, the extremity of a promontory about 19 miles east-north-eastward, is low, sandy, and broken in places by rocky ledges. One of these ledges lies about 5 miles north-eastward of the northern entrance point of Tingtzetsui kow, and about half a mile off this ledge is a reef which dries 8 feet (2m4); a flat-topped hill, 796 feet (242m6) high, is situated about 3 miles north-north-westward of this ledge.

Haiyanghsien is a walled city situated about half a mile within a projecting point about 6 miles westward of Low point, and partly on the southern slope of a hill 399 feet (121m6) high; a rocky ledge, the outer part of which is sunken, extends about 1½ miles southward

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Chart 3735.

from this point. An irregular range of hills extends about 7 miles in a northerly direction from Haiyanghsien and then turns eastward. Farther northward is a range of mountains, the highest peak of which is the conspicuous, dome-shaped Lung shan, situated about 10 miles north-eastward of Haiyanghsien; from Lung shan the range continues in a south-easterly direction to the coast.

Between Haiyanghsien and Low point is a bight with sandy shores, from which two rocky ledges extend for a short distance; rocky ledges also extend as much as three-quarters of a mile from Low point. Zhushan kow, entered between Low point and a headland, 666 feet (203^{m}0) high, about 3½ miles north-eastward, has depths of 2½ fathoms (4^{m}6) at the entrance, decreasing gradually towards the shores of the bay.

Taho inlet.—The headland on the north-eastern side of Zhushan kow lies on the western side of the entrance to Taho inlet. On the eastern side of the entrance are the two Central islands, joined together by a sandbank, and lying about 2 miles south-eastward of the headland; the northern island is connected to the eastern entrance point of the inlet by a spit which dries. A rock awash lies about 3 cables eastward of the northern island.

The shores of Taho inlet are hilly; the western entrance point is 145 feet (44^{m}2) high and steep-to. Nearly one mile eastward of the eastern entrance point is a tusk-shaped hill 702 feet (214^{m}0) high, and about 1½ miles farther eastward is a sharp summit 598 feet (182^{m}3) high.

A least depth of 2 fathoms (3^{m}7) can be carried through the approach to Taho inlet; in the entrance, which is about 3 cables wide, the depths increase suddenly to from 4 to 9 fathoms (7^{m}3 to 16^{m}5). A rock, 10 feet (3^{m}0) high, lies about half a mile within the entrance; the inlet then runs in a north-easterly direction, and has depths of from 3 to 5 fathoms (5^{m}5 to 9^{m}1) for about 1½ miles, after which it becomes shallow. The rate of the tidal streams at the entrance and within the inlet is reported to be considerable at spring tides.

Coast.—Arthur head, about 2½ miles eastward of the southern Central island (*Lat. 36° 44′ N., Long. 121° 29′ E.*), is an island connected to the main coast by a flat which dries; its southern side is bold and cliffy, and on its western part is a sharp, conical summit 416 feet (126^{m}8) high. An islet, about 150 feet (45^{m}7) high, lies close off its western extremity.

Between the eastern end of Arthur head and a point about 1½ miles eastward is the entrance to a bay, almost entirely occupied by flats which dry, leaving only a small basin, with depths of from 3 feet to 2 fathoms (0^{m}9 to 3^{m}7); rocky ledges extend from both entrance points, leaving a passage only about one cable wide between them. An islet, 120 feet (36^{m}6) high, lies about half a mile southward of the eastern entrance point. Bamba shan, a hill with a small temple on its summit, is situated about 1½ miles northward of the head of the bay.

Chart 3554.

Tau tsui, about 2 miles eastward of the eastern entrance point of the bay just described, is the south-eastern extremity of a bold, hilly peninsula, connected to the mainland by a sandy isthmus. Fungwha shan, the highest hill on the peninsula, has a large mound on its

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Chart 3554.

summit. Chu tan is an island lying nearly half a mile off the south coast of the peninsula, to which it is connected by a sandbank.

Off-lying rocks.—Hwei tan, a rock 24 feet (7^{m}3) high, lies about 3½ miles southward of Tau tsui; a rocky ledge extends about one cable south-eastward from it. A rock, which dries one foot (0^{m}3), lies about half a mile north-eastward of Hwei tan.

Poh wang tan.—Poh wang tan is entered between Tau tsui and Kungkia tao, an island about 5 miles north-eastward. The shore of the bay is steep for about 2 miles northward of Tau tsui, and then becomes low, with a few rocky points in the southern part. At the head of the bay is a lagoon which nearly dries. Yau tao is a wedge-shaped islet lying about one mile southward of the narrow entrance to the lagoon; rocky ledges extend from the shore westward of this islet.

Kungkia tao lies on a reef extending nearly 2 miles in a southerly direction from the shore; a rock awash lies about a quarter of a mile off the southern extremity of this reef.

The bay affords good shelter for small vessels from northerly and westerly winds, but the bottom is soft mud, and is not good holding ground. North-easterly winds send a nasty sea into the bay, except where sheltered by Kungkia tao.

Coast.—Islets and dangers.—Phoenix point (*Lat. 36° 51′ N., Long. 121° 45′ E.*) is situated about 3 miles north-eastward of Kungkia tao, and about midway between is a cliffy point from which rocky ledges extend nearly half a mile. About three-quarters of a mile northward of Phoenix point is a slight indentation in the coast, known as Cochran landing, which is much encumbered by reefs, some of which dry, extending up to a mile offshore; it is a convenient and sheltered landing place, even with on-shore winds.

The coast between Cochran landing and Goose point, a low sandy point nearly 12 miles east-north-eastward, is low and sandy. Nainai shan is a conspicuous summit about 2 miles north-westward of Cochran landing. Eastward of Nainai shan the hills recede some miles inland, leaving an extensive plain through which a river, only navigable by sampans, flows and enters the sea about 3½ miles north-eastward of Cochran landing. Several reefs lie within a distance of one mile off the entrance to this river. Another river flows out about 6 miles north-eastward of Cochran landing, and a reef, which dries 8 feet (2^{m}4), lies nearly 2½ miles eastward of its mouth and about 1½ miles offshore.

Wuleitao wan (Mud Flat bay), entered between Goose point and Red Cliff point, about 5 miles south-eastward, practically dries throughout. Red Cliff point is a rock with steep reddish cliffs lying on the extremity of a narrow sandy spit; another rock, 90 feet (27^{m}4) high, lies on this spit. Red islet consists of several rocks or islets surrounded by reefs; the outer rock is 40 feet (12^{m}2) high and lies nearly 1½ miles south-south-westward of Red Cliff point; about 3 cables northward of this rock, and connected to it by a reef, is an islet 107 feet (32^{m}6) high; the easternmost islet, a sharp pinnacle rock 60 feet (18^{m}3) high, lies about 6 cables south-eastward of Red Cliff point. Gribble rock, with a depth of 1½ fathoms (2^{m}7) over it, lies about 2¾ miles south-westward of Red Cliff point.

Ching hai bay.—Ching hai bay, between Red Cliff point and

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Chart 3554.

Ching hai point, about 7 miles east-south-eastward, has general depths of from 1¼ to 2¾ fathoms (2m3 to 5m0), except at the head, which is very shallow. The shores of the bay are low, and are indented by several creeks which dry.

Ching hai point is cliffy and 40 feet (12m2) high; Low island lies on a rocky ledge which extends about 6 cables south-westward from the point. The walled city of Ching hai wei is situated close within the point, but it was only partially inhabited in 1904, and the walls were then practically in ruins; there is a conspicuous temple close northward of the city.

Lockhart inlet penetrates the land in a northerly direction at the head of the bay; it appears capacious at high water, but the navigable channel, between steep banks of mud and sand which dry, is only about 2 cables wide. There are depths of from 3½ to 5½ fathoms (6m4 to 10m1) in the fairway up to a distance of about 4 miles within the entrance, where the inlet turns eastward for about a mile, with depth of about 2 fathoms (3m7), and then opens out into a wide basin mostly filled by flats which dry. The entrance to the inlet is obstructed by a bar of hard sand and mud, with a least depth of 5 feet (1m5). The tidal streams set round Ching hai point into and out of the bay, of 4 knots.

Small craft can obtain temporary anchorage westward of Ching hai point (*Lat. 36° 51′ N., Long. 122° 11′ E.*), in depths of from 1½ to 2¾ fathoms (2m7 to 5m0), sheltered from easterly winds; this anchorage, however, is not recommended, as should the wind veer to the southward a heavy sea sets in, especially during the south-going stream. The tidal streams set round Ching hai point into and out of the bay, and may attain a rate of 2 knots.

Coast.—The coast between Ching hai point and South cape, about 8 miles eastward, is alternately low and cliffy, and is fringed by reefs in places. Cha shan, a sharp peak surmounted by a small joss-house, is situated about 5 miles eastward of Ching hai point and about one mile inland; from this peak a rugged range of mountains extends eastward to the western entrance point of Wangkia bay; *see* view facing page 315.

A shoal, with a least depth of 2¾ fathoms (5m0), lies about one mile south-eastward of Ching hai point and from a half to one mile offshore. Stanley point is situated about 5 miles eastward of Ching hai point, and two rocks, 2 and 3 feet (0m6 and 0m9) high, respectively, lie about 2 cables south-westward of Stanley point; an islet, 41 feet (12m5) high, lies about 4 cables east-south-eastward of this point.

Immediately westward of South cape is a small bay, where landing can be effected with southerly winds; a reef extends about 3 cables south-eastward from the western entrance point of this bay, and near its outer end is an islet, 10 feet (3m0) high. Foul ground extends about a quarter of a mile southward from South cape.

Off-lying island and rocks.—Staunton island or Susu shan is situated about 6 miles south-westward of South cape, and rises to an elevation of 366 feet (111m6) in its south-eastern part. In 1904 there was a fishing village with a landing place on the north-eastern side of the island; and another on the south-western side, but they were only occupied during the spring. An islet lies close off the north-west point, and another islet lies off the south-west point. A third islet lies

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Chart 3554.

off the south-east point of Staunton island and is practically connected to it; a rock, with a depth of less than 6 feet (1m8), lies about 1¼ cables southward of this islet, and a 4-fathom (7m3) patch lies about one cable south-westward of this rock.

South Channel rock, 68 feet (20m7) high, lies about one mile north-westward of the north-west point of Staunton island; a sunken rock lies about half a cable southward, and a rock with a depth of less than 6 feet (1m8) lies about 2 cables north-north-eastward of South Channel rock.

North Channel rock, 86 feet (26m2) high, lies about three-quarters of a mile northward of South Channel rock, and is the highest of a group of rocks; foul ground extends about 2 cables southward from these rocks, and a rock with a depth of less than 6 feet (1m8) lies about 2 cables northward of them.

Witch rock, about 3 miles eastward of North Channel rock, has a depth of 1½ fathoms (2m7) over it and is steep-to, with depths of from 9 to 10 fathoms (16m5 to 18m3) around; it breaks heavily.

Fishing nets.—From November to June, inclusive, fishing nets are laid out for a distance of 5 miles from the land in this locality. They are floating bag nets with a framework of spars, some of which are of considerable size, moored to the bottom in rows, sometimes half a mile in length, and when the tidal streams are strong they are not visible.

Tidal streams.—Off the south coast of the Shantung peninsula the tidal stream sets westward with the rising tide, and eastward with the falling tide. During the west-going stream there is a considerable indraught into all the bays westward of Ching hai point. The west-going stream attains a general rate of 1½ knots, and the east-going stream 1¾ knots; both streams are affected by the winds.

Chart 3468, plan of Wangkia bay.

Wangkia bay.—Dangers.—The western entrance point of Wangkia bay is situated about 2 miles north-eastward of South cape, and on it is the village of Laushih tao. The two Wangkia islands, joined together by a reef, are separated from the point by a boat channel. The eastern entrance point of the bay is situated nearly one mile north-eastward of the eastern Wangkia island, and has a hill on it 466 feet (142m0) high.

The western shore of Wangkia bay is a long sandy beach, and immediately northward of the western entrance point is a lagoon which dries. The northern shore is steep and rocky, with reefs extending about one cable in places. Dau shan (*Lat. 36° 53′ N., Long. 122° 23′ E.*) is a flat summit about one mile northward of the northern shore of the bay.

An islet, 30 feet (9m1) high and connected to the coast by a reef, lies about one mile eastward of the eastern entrance point of Wangkia bay. Bedwell rock, with a depth of 1½ fathoms (2m3), lies about 3½ cables southward of this islet. Blakeney rocks lie about half a mile westward of Bedwell rock; the outer rock lies about a quarter of a mile offshore and dries 7 feet (2m1).

The best anchorages in Wangkia bay are northward of the eastern Wangkia island, in a depth of 3½ fathoms (6m4), and northward of the western island, in a depth of 2 fathoms (3m7).

Charts 3491, 1255, 1256 3480, 1262.

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Chart 3299.

Shihtao bay.—The western entrance point of Shihtao (Shitau) bay is a rocky point situated about one mile north-eastward of the 30-foot (9^{m}1) high islet previously mentioned; reefs extend about 2 cables south-eastward from this point, and terminate in a rock which dries 6 feet (1^{m}8). Dausi tao, the eastern entrance point, is situated about 2½ miles east-north-eastward of the western entrance point, and is the south-western extremity of Mui tau, an island connected to the mainland by a sand flat. Dausi tao is a bluff headland 97 feet (29^{m}6) high, connected to Mui tau by a low neck; the headland is fringed by reefs extending as much as 2 cables. Pinnacle rock, 40 feet (12^{m}2) high, lies about 1½ cables off the southern extremity of the headland, and Outer rock, 12 feet (3^{m}7) high, lies nearly 3 cables east-south-eastward of this extremity.

On the western side of the bay, and about half a mile north-north-westward of the western entrance point, is a rocky headland named Pauti, from which foul ground extends about a quarter of a mile northward. The town of Shihtao (Shitau) is situated about half a mile westward of Pauti; Si shan is a conspicuous peak about 1¾ miles north-westward of the town. Chisai rock, which dries one foot (0^{m}3), lies about one mile northward of Pauti and half a mile offshore.

The northern shore of the bay is mostly rocky, and rises about three-quarters of a mile inland to Sharp peak, a rugged hill at the southern extremity of a range rising to its greatest elevation in Temple saddle, situated about 2 miles northward of Sharp peak. The northern shore is fringed by reefs; Oyster rock, 4 feet (1^{m}2) high, lies on the southern extremity of a detached reef and about 1½ miles south-south-eastward of Sharp peak. Sharp peak in line with Oyster rock, bearing 338°, leads into the bay clear of the reefs extending from Dausi tao.

Small vessels can anchor about three-quarters of a mile north-eastward of the town of Shihtao, in depths of from 21 to 22 feet (6^{m}4 to 6^{m}7), and also in the eastern part of the bay, in the same depths, about 3 cables north-westward of Dausi tao. The bay affords good shelter with northerly winds, and the depths decrease gradually towards the head. Anchorage can be obtained south-westward of and outside the entrance to the bay, in depths of from 8 to 10 fathoms (14^{m}6 to 18^{m}3), from one to 2½ miles offshore.

Mui tau.—Dangers.—Light.—Mui tau is a low island, and its coasts for the greater part consist of low cliffs fringed by reefs. The south-eastern extremity of the island is a headland 26 feet (7^{m}9) high, from which a reef extends about 1½ cables; a detached reef, which dries 2½ feet (0^{m}7), lies about 3 cables south-westward of the headland. Iltis cemetery, where the bodies of the captain and some of the crew of the German gunboat *Iltis*, which was wrecked off Pingyeng kiao in 1896, is situated on this headland; it is a small oasis of trees and greenery in an otherwise barren land.

A light is exhibited, at an elevation of 96 feet (29^{m}3), from a circular tower, 77 feet (23^{m}5) in height, painted red and white in horizontal bands, on the south-east point of Mui tau; the keepers' dwelling is white. *See* view facing page 332. A fog signal is sounded from the lighthouse.

Daudung tao (*Lat. 36° 55′ N., Long. 122° 32′ E.*), the east point of the island, is low and sandy; a reef extends about half a mile eastward from the point, and near the outer extremity of the reef

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Chart 3299.

is Lau diau, consisting of two rocks, one of which is 8 feet (2m4) high. A reef, which dries one foot (0m3), lies about 6 cables north-eastward of Daudung tao, and a rock, with a depth of 8 feet (2m4) over it, lies about the same distance north-eastward of the point.

Schwilp patches, with a least depth of 21 feet (6m4) lie between three-quarter of a mile and one mile east-south-eastward of Daudung tao.

Anchorage.—There is anchorage for large vessels, during northerly or north-westerly winds, off the south coast of Mui tau, in a depth of 36 feet (11m0), with the lighthouse bearing 041°, distant 6½ cables; small craft can anchor about 1¾ cables north-westward of the detached reef lying south-westward of the lighthouse, in a depth of 24 feet (7m3).

There is a pier on the western side of the point on which the light-house is situated, where boats can land, except near low water; a black beacon, surmounted by a cylinder, 8 feet (2m4) in height, marks the outer end of the pier.

Chart 1255.

Outlying shoals.—A shoal, with a depth of 5½ fathoms (10m1) over it, was reported, in 1927, to exist at a distance of 19½ miles south-eastward of Mui tau lighthouse; this shoal has been searched for without success.

A shoal, with a depth of 5 fathoms (9m1) over it, was reported by H.M.S. *Argus*, in 1928, at a distance of about 26 miles east-north-eastward of Mui tau lighthouse.

Charts 3299, 3491.

Coast.—Dangers.—The coast between Daudung tao and Pingyeng kiao, about 7½ miles northward, is low. Ears rock, about 3 miles north-north-eastward of Daudung tao and 1½ miles offshore, is 57 feet (17m4) high, and from some directions has the appearance of an ass's ears; reefs extend as much as a quarter of a mile around the rock, and the passage between it and the coast westward is foul. A rock, 8 feet (2m4) high, lies about 8 cables northward of Ears rock, with depths of less than 5 fathoms (9m1) between. The bay which is entered between Daudung tao and Ears rock is clear, and affords anchorage in depths of from 4 to 8 fathoms (7m3 to 14m6).

Chart 3491.

Pingyeng kiao (Chutao tsui) is connected to the mainland by a sand-bank, a small portion of which covers at high water; the village of Chutao is situated on the western part of the island, and there are two joss-houses on the southern side. Reefs, with rocks above water and sunken rocks, extend about 6 cables southward, 3 cables eastward, and one mile northward from Pingyeng kiao; Four-fathom patch, nearly 1½ miles north-eastward of its north-east point, has a rocky bottom.

The north-going stream off Pingyeng kiao runs from about 4½ hours after high water at Weihaiwei until about 2 hours before the next high water there, and the south-going stream from about 2 hours before until 4½ hours after high water at Weihaiwei.

Sankow wan.—Sankow wan (Sangkau bay), entered between Pingyeng kiao and a point about 6¼ miles northward, has general depths of from 6 to 8 fathoms (11m0 to 14m6) in the entrance, decreasing gradually towards the shore. The southern shore of the bay is low, except for Lauma shan (*Lat. 37° 01′ N., Long. 122° 27′ E.*), a steep,

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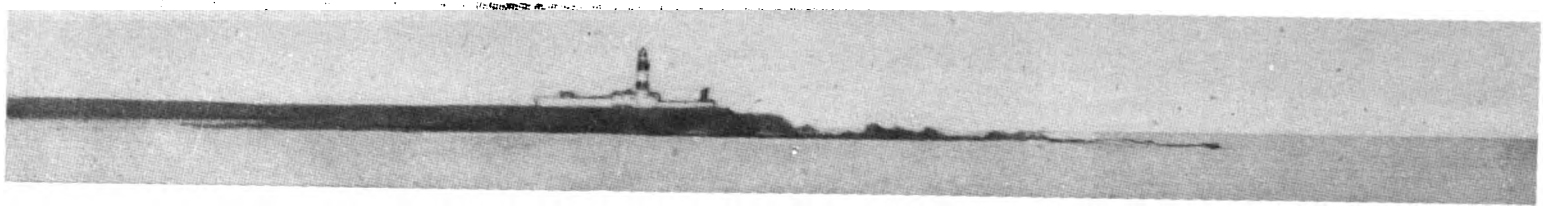

MUI TAU LIGHTHOUSE

(*Original dated 1899*).

Shantung promontory.

(*Original dated 1850*).

N.E. promontory, bearing 013°, distant 3 miles.
(*Lighthouse not shown.*)

N.E. promontory, from the northward, 12 miles.
(*Lighthouse not shown.*)

(*Original dated 1872*).

Two views of Shantung promontory.

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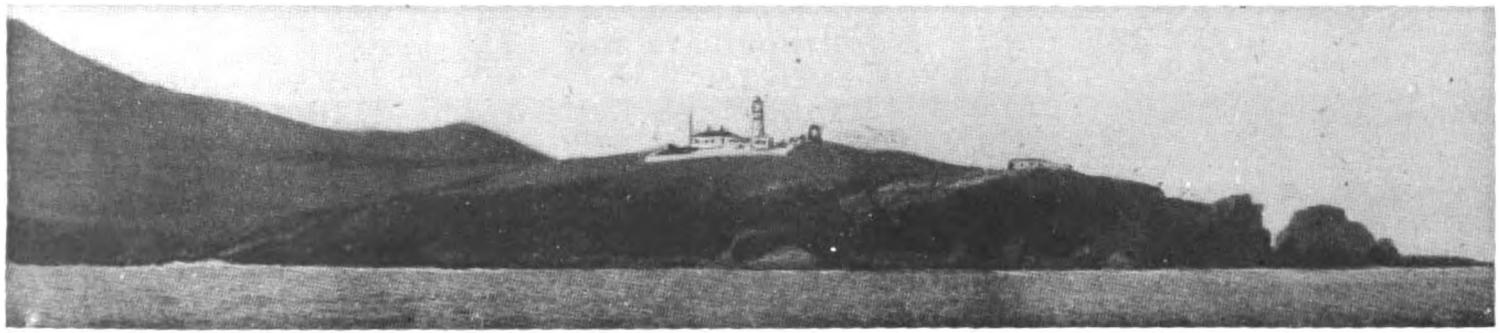
Alceste island, bearing 127°, 1¼ *miles.*

View, in two parts, of Shantung promontory from north-westward.
(Original dated 1860).



North-east promontory lighthouse from southward.
(Original dated 1932).

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Chart 3491.

rugged hill at the western end. A reef, which dries 3 feet (0m9), lies about 1¼ miles westward of the north point of Pingyeng kiao. Lungmunn chiang is an inlet in the south-western corner of the bay, but the greater part of it dries. Falang shih, about 1¾ miles north-north-eastward of Lauma shan, is a mass of large boulders; above water and sunken rocks lie within a distance of 3 cables south-westward of it.

The western shore is also low, but about 3½ miles north-westward of Falang shih and 1¼ miles inland is Lao shan, a steep, rugged hill. The southern part of this shore is fringed by reefs and rocks. Poko tao is a reef, which dries, lying with its southern extremity about half a mile northward of Falang shih, and there is a rock on it 2 feet (0m6) high. A rock, on which the *Hino maru*, with a draught of 18 feet (5m5), is stated to have struck in 1907, is reported to lie about 3 miles northward of Falang shih and 1½ miles offshore. Westward of the reported position of this rock is the entrance to a large lagoon, the greater part of which dries; the entrance is fronted by sandbanks, and close north-eastward of it are some rocks 10 feet (3m0) high.

The northern shore consists of cliffs from 80 to 100 feet (24m4 to 30m5) high. Village hill, with a conspicuous tree on it, is situated about three-quarters of a mile within the western part of this shore. A reef, with a least depth of 1¼ fathoms (2m3) over it, lies southward of this hill and about one mile offshore; there is foul ground north-north-westward of this reef. Numerous rocks lie within 2 cables of the northern shore of the bay, and reefs and rocks extend about 3 cables eastward from the northern entrance point; Alexander patch, with a depth of 4¾ fathoms (8m7), lies nearly one mile southward of the northern entrance point.

Sankow wan affords shelter to small vessels except with easterly winds; with these winds, however, vessels can anchor about three-quarters of a mile north-westward of Chutao village, in a depth of 4 fathoms (7m3), somewhat protected by the reef extending northward from Pingyeng kiao. When approaching this anchorage, Falang shih may be steered for bearing 255°, which leads about half a mile northward of Four-fathom patch and the shoals extending northward from Pingyeng kiao.

Chart 3468, plan of Aylen bay.

Aylen bay.—Haimaotzu tao is a cliffy point situated about three-quarters of a mile northward of the northern entrance point of Sankow wan, and the coast between is fringed by reefs and rocks extending as much as a quarter of a mile; Sphinx rock, 20 feet (6m1) high, lies about 2 cables offshore midway between these two points.

Aylen bay is entered between Haimaotzu tao and Mata kiao (Tutzushih point), nearly 3 miles north-eastward; there are depths of from 5¾ to 8 fathoms (10m5 to 14m6) in the entrance, decreasing gradually towards the head of the bay. In 1923, the *Eian maru*, with a draught of about 9 feet (2m7), reported grounding on a shoal situated about 7 cables southward of Mata kiao.

Middle point, a rocky headland, divides Aylen bay into two parts, each of which affords fair anchorage with north-easterly winds; Middle point is fringed by rocks and shoals within a distance of 2 cables. Small vessels can anchor northward of Shutao hummock,

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Chart 3468, plan of Aylen bay.

situated about 4 cables north-westward of Haimaotzu tao, in a depth of about 3½ fathoms (6m4), and also westward of Middle point.

Mata kiao (*Lat. 37° 12′ N., Long. 122° 37′ E.*) is a flat, rocky headland, 30 feet (9m1) high, joined to the mainland by a narrow neck; it is surrounded up to a distance of 2 cables by reef and rocks. There is a joss-house on the inner end of the headland. About 4 cables northward of Mata kiao is a point 50 feet (15m2) high, from which shoal water extends about 4 cables north-eastward; there is usually a heavy tide-race off this point.

Chart 3491.

Coast.—The coast between Mata kiao and Watao shih, about 3 miles north-north-westward, is low, with cliffs 50 feet (15m2) high in places, and is fringed by reefs, which extend about 3 cables northeastward from Watao shih; a rock, 6 feet (1m8) high, lies about 3 cables eastward of this point, and a 1½-fathom (2m3) patch lies close southward of this rock.

Chart 3468, plan of Litau bay.

Litao wan.—Islands and dangers.—Litao shan is a steep hill about three-quarters of a mile north-westward of Watao shih. A reef, which dries, extends nearly three-quarters of a mile in a northerly direction from the coast at the foot of this hill, and on this reef are the two Gravel islands; North Gravel island has reddish cliffs on its northern and eastern sides, and some rocks above water lie close off its north-east point.

The Thumb (*Lat. 37° 16′ N., Long. 122° 30′ E.*), a peak shaped like a thumb, is situated about 2¾ miles westward of the head of Litao wan, and from it a range extends westward; on this range, and about 2¾ miles westward of The Thumb, is a sharp shoulder, 1,683 feet (513m0) high, and nearly 1½ miles farther westward is Mount Wade, with a flattish top.

Litao wan is entered between North Gravel island and Hei shih, a reef with two rocks on it, 3 and 4 feet (0m9 and 1m2) high, respectively, about 9 cables northward; there are depths of less than 3 fathoms (5m5) for 3 cables eastward and westward of Hei shih.

Green island lies on a reef which extends about 4 cables from a point on the north-western side of the bay and about 8 cables westward of Hei shih; a rock, 6 feet (1m8) high, lies about 1½ cables southward of Green island.

Litao wan is open to north-easterly winds, but is sheltered from south-eastward by the Gravel islands; numerous junks usually lie here. The best anchorage for small vessels is on the southern side of the bay, in a depth of about 3½ fathoms (6m4), with the south point of North Gravel island bearing 100°, distant 2¾ cables. This anchorage is off the small town of Litao, which had, in 1903, a considerable coasting trade.

Charts 3491, 3457.

Coast.—Linglo tan is a bay which is entered between Hei shih and Ku to, a steep, narrow headland about one mile north-north-westward, on which is a rocky summit 209 feet (63m7) high; a small islet, 25 feet (7m6) high, lies close off Ku to, and there are several rocks within a cable of this headland. The bay is divided into two parts by a point in the north-western portion, from which a spit, with an island 30 feet (9m1) high on it, extends fully half a mile south-eastward; Cole rocks,

Charts 1255, 1256, 3480, 1262.

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Charts 3491, 3457.

with depths of less than 6 feet (1m8) over them, lie about 2 cables south-eastward of the island. Owing to the rocky nature of the bottom, the bay is not recommended as an anchorage.

The coast between Ku to and Stevens point, about three-quarters of a mile northward, is indented by a few small bights and is fringed by rocky ground.

Chart 3468, plan of Yangyuchih bay.

Yangyuchih bay.—Dangers.—Directions.—Yangyuchih bay is entered between Stevens point and Chiao tao, an island lying about midway between this point and a point with a joss-house on it nearly three-quarters of a mile north-eastward. Chiao tao is a flattish, green island, and between it and the northern shore of the bay there is foul ground, over which boats can only pass at high water. A sand spit, which dries, extends nearly 2 cables north-westward from the northern side of the island and terminates in Gull rock, which dries 4½ feet (1m4); reefs extend about one cable from the south-eastern extremity of the island. Gibson rock, with a depth of 1¾ fathoms (3m2), lies about 3 cables south-eastward of Chiao tao. A rock, which dries 2 feet (0m6), lies nearly one cable north-eastward of Stevens point.

Tungyung shan, with a conspicuous joss-house on it, rises to an elevation of about 100 feet (30m5) on the southern side of the bay and about half a mile north-westward of Stevens point. Direction point is situated about 6 cables northward of the joss-house just mentioned, and from a short distance above this point the bay dries completely.

The bay should be entered with Direction point bearing 322°, and just open south-westward of Chiao tao; thence pass about a cable south-westward of the island, and anchor about 2 cables westward of its south-west point in a depth of 3½ fathoms (6m4). Vessels approaching from the northward should keep Mount Stanley (page 336) bearing not more than 027°, and open eastward of Mashan to (chart 3457), so as to pass eastward of Gibson rock. South-easterly winds send a nasty sea into the bay.

Charts 3457, 3491.

Coast.—Off-lying rocks.—The coast between the northern entrance point of Yungyuchih bay and Mashan to, about 1½ miles north-eastward, is steep, rocky and fringed by reefs. Mashan to is the extremity of a steep, rocky peninsula 240 feet (73m1) high; a pinnacle rock, 25 feet (7m6) high, lies close off the point, and a rock, 12 feet (3m7) high, lies about 2 cables eastward of the point. Kwa shih, about 7 cables eastward of Mashan to, is a rock 19 feet (5m8) high; North-east promontory light (page 336) is obscured over this rock.

Ma shan, nearly one mile westward of Mashan to, is a conspicuous, smooth-topped, saddle-shaped hill. Northward of Ma shan is a plain, which separates the high land of Shantung promontory from that of Shangtung peninsula.

Yungching bay.—Dangers.—Yungching bay is entered between Mashan to and Heitsuitze (*Lat. 37° 23′ N., Long. 122° 41′ E.*), about 4½ miles north-eastward; the north-western shore of the bay is sandy.

Mashan chiang, a lagoon within the south-western part of the bay, is separated from the sea by a narrow strip of sand; its entrance is

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Charts 3457, 3491.

about one mile north-westward of Mashan to. Yungching hsien is a walled town situated on the sandy plain about three-quarters of a mile north-westward of Mashan chiang.

A low, rocky point, with a joss-house on it, is situated about 2¾ miles north-north-eastward of Mashan to; a rock, with a depth of 6 feet (1m8) over it, lies about one cable south-eastward of this point.

Dove cove, in the north-eastern part of Yungching bay, is shallow, and rocks extend about 1½ cables from its eastern shore.

Heitsuitze is the southern extremity of a promontory with two rugged hills on it, 308 and 391 feet (93m9 and 119m2) high, respectively; a rock, with a depth of 2½ fathoms (4m6) over it, lies about 2 cables south-westward of Heitsuitze, and a 4½-fathom (8m2) patch lies about 1½ cables farther south-westward.

Yungching bay affords shelter with winds between south-west and north-east, through north, in depths of from 4 to 7 fathoms (7m3 to 12m8); small craft can obtain shelter from easterly winds in Dove cove. Vessels bound for the Gulf of Pohai, encountering a north-westerly gale in this locality, can shelter in Yungching bay until it has abated.

Shantung promontory.—Shantung promontory, forming the north-eastern part of the Shantung peninsula, mostly consists of a series of peaked hills, from 300 to 885 feet (91m4 to 269m7) high; these hills are separated from each other by deep valleys, and appear as islands from a distance south-eastward or north-westward. *See* views facing pages 332, 333.

Chung shan, the westernmost and highest hill, is situated about 4 miles west-north-westward of Heitsuitze, and appears very pointed and precipitous from northward. Mount Stanley is situated about 2½ miles north-westward of Heitsuitze.

Coast.—Light.—About midway between Heitsuitze and North-east promontory is a bay with a sandy beach, where stores for the lighthouse are landed during north-westerly winds; reefs extend about 2 cables from the northern shore of this bay.

North-east promontory is a rugged and broken cliff, and rises about 4 cables westward to a conical hill 368 feet (112m2) high, with a conspicuous red temple on its southern slope; the promontory is steep-to. *See* view facing this page. Wrecks in this locality have been numerous, as fog is frequent, and there is a dangerous tide-race half a mile off-shore; in thick weather every opportunity should be taken to fix the vessel's position, and soundings should be taken constantly.

A light is exhibited, at an elevation of 220 feet (67m1), from a white circular tower, 64 feet (19m5) in height, situated on North-east promontory; the keepers' dwellings are white. A fog signal is sounded from the lighthouse. *See* view facing page 333.

Tidal streams.—Eastward of North-east promontory the tidal streams run northward from between 5 and 6 hours after high water at Weihaiwei until between one and 2 hours before the next high water there, and southward for the remaining period. The tidal streams attain a rate of 2½ knots about 1½ miles eastward of the promontory, but they are influenced by the winds.

For the tidal streams at a position about 7 miles eastward of the promontory, *see* note on tidal streams in psoition D on chart 3457.

Charts 1255, 1256, 3480, 1262,

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Chart 3457.

Coast.—Off-lying island and dangers.—The coast between North-east promontory and Bluff point (*Lat. 37° 25′ N., Long. 122° 40′ E.*), about 2½ miles north-westward is rocky and indented by small bays. A rocky patch, with a rock on it 10 feet (3m0) high, lies about a quarter of a mile northward of the promontory. About half a mile north-westward of the promontory is a landing place, with steps cut in the rock, where stores for the lighthouse are landed during southerly winds.

Wohu shih, about three-quarters of a mile eastward of Bluff point and half a mile offshore, has a depth of one foot (0m3) over it and breaks in a heavy sea.

Alceste island, about 1¼ miles northward of Bluff point, is flat-topped and bordered by cliffs; some rocks, one of which is 2 feet (0m6) high, lie within a distance of 3 cables north-eastward of the island. Kwa shih, a pinnacle rock 5 feet (1m5) high, lies about a quarter of a mile southward of the eastern end of Alceste island and a rock, which dries one foot (0m3), lies about 1¼ cables eastward of this pinnacle rock.

Owing to the existence of Wohu shih and Kwa shih it is not advisible to use the channel southward of Alceste island at night; the overfalls in the channel are very heavy at spring tides, and extend from North-east promontory to about 2 miles westward of Alceste island.

Tidal streams.—Northward of Alceste island the tidal streams run north-westward from 6 hours after high water at Weihaiwei until about 2 hours before the next high water there, and south-eastward from about one hour before until 5 hours after high water at Weihaiwei. The tidal streams may attain a rate of from 1½ to 2 knots, but are affected by the winds. *See* also note on tidal streams in position C on chart 3457.

The tidal streams in the channel between Alceste island and Shantung promontory attain a rate of from 2½ to 3 knots.

Chart 3468, plan of Malan and Lungyen coves.

Malan and Lungyen coves.—Malan cove is entered between Bluff point and Separation point, about half a mile westward; reefs, on which are some above-water rocks, extend nearly one cable northward and westward from Bluff point. Cliff point, at the head of the cove, is steep and cliffy; a reef extends about one cable north-eastward from it. Malan cove is a convenient anchorage for small vessels during southerly or easterly winds; northerly and north-westerly gales send in a heavy sea. The best anchorage is 3 cables south-westward of Bluff point, in depths of from 5 to 5¾ fathoms (9m1 to 10m5), tenacious mud.

Lungyen cove is entered between Separation point and a point about 4 cables westward. Rocks extend about 2 cables from its eastern shore, and the cove does not afford the same amount of shelter as Malan cove.

Chart 3457.

Coast.—Hsia kow, a cove about three-quarters of a mile westward of Lungyen cove, is frequented by fishing boats.

The coast for about 2½ miles south-westward of the western entrance point of Hsia kow is rocky and indented, and reefs extend nearly 2 cables in places. Thence to Chau yang point, a low, cliffy point about 4½ miles farther westward, there is a sandy beach. Yungching sandhill

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Chart 3457.

is situated about three-quarters of a mile inland from the eastern end of this beach. The entrance to Chau yang lagoon, which nearly dries, lies about 1½ miles south-south-eastward of Chau yang point. Reefs and rocks, some of which are above water, extend about half a mile northward and north-westward from Chau yang point.

Chiming tao (*Lat. 37° 27′ N., Long. 122° 29′ E.*), about one mile northward of Chau yang point, is a flat-topped island fringed by reefs, which extend about a quarter of a mile from its western side. There are irregular depths of from 3 to 5 fathoms (5m5 to 9m1) in the channel between the reefs extending from Chiming tao and those extending from Chau yang point. The west-going tidal stream in this channel attains a maximum rate of 2½ knots, and the east-going stream 1¾ knots. In 1934 H.M.S. *Sandwich* passed through this channel during the strength of both the east-going and west-going streams, without experiencing difficulty from tide-rips and eddies. For the tidal streams northward of Chiming tao, see note on tidal streams in position B on chart 3457.

Abnormal magnetic variation.—In 1935 abnormal magnetic variation was reported about 1½ miles northward of Chiming tao, an increase of 4° westerly variation having been observed. In 1936 an increase of about 5° westerly variation was observed in the same position.

Coast.—Nearly 1½ miles south-westward of Chau yang point is a cliffy point about 40 feet (12m2) high; there is a good landing place on the western side of this point, but the beach shelves rapidly. The coast for about 6½ miles westward of this point is sandy and low, except for a sandy headland, 143 feet (43m6) high, situated about 5 miles westward of Chau yang point; reefs, which dry, extend as much as 4 cables off this headland and off the coast for 2 miles westward. About 2½ miles westward of the sandy headland is the entrance to a small lagoon, and the coast then becomes rocky and broken as far as Trench cove, about 2 miles farther westward. Trench cove is small, and of no importance; a rock, which dries 2 feet (0m6), lies about a quarter of a mile off its eastern entrance point.

Chart 2823.

Yin shan bay, entered between the western entrance point of Trench cove and a point about 1½ miles north-north-westward, affords good anchorage in a depth of 8 fathoms (14m6), sheltered from winds between south-west and north-west; a heavy swell sets in with north-easterly winds. The Wuchu and another river flow into the bay, and at the entrance to the Wuchu is a lagoon available for small junks at high water.

Three Peaked point, about half a mile northward of the northern entrance point of Yin shan bay, is rocky; it has three peaked rocks at its foot, and a ledge of rocks, which is steep-to, extends about 1½ cables from it. There are several rounded hills near the point, Beacon hill, about 4 cables westward, being the highest and most conspicuous; Beacon point is situated at the foot of this hill and about 4 cables north-westward of Three Peaked point.

Chao pei tsui is a bluff point about 1½ miles westward of Beacon point, the coast between being cliffy and rugged; a rock, 10 feet (3m0) high, lies on a reef which extends about half a cable from Chao pei tsui.

Charts 1255, 1256, 1262.

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Chart 2823.

Light.—A light is exhibited, at an elevation of 94 feet (28^{m}7), from a white circular iron tower, 35 feet (10^{m}7) in height, situated on Chao pei tsui (*Lat. 37° 28′ N., Long. 122° 14′ E.*); the keepers' dwelling is white.

Charts 3025, 2823.

WEIHAIWEI ANCHORAGE.—Weihaiwei anchorage lies in a bay entered between Chao pei tsui and Pei shan point, about 5½ miles north-westward, and is sheltered from seaward by Liu kung tao, an island lying between the two entrance points; the anchorage is easy of access and affords shelter to a considerable number of vessels of moderate draught, but the area available for large vessels is restricted. There are two entrances, the eastern leads southward of Liu kung tao, and the western leads north-westward of this island.

Weihaiwei was retroceded to China in 1930. The surrounding territory is administered by a Chinese Commissioner, resident on the mainland; Liu kung tao is administered by a Chinese Naval officer, who is responsible to the Commissioner. There is a British Consul at Mato, on the mainland.

Depths.—The eastern entrance has a least depth of 18 feet (5^{m}5), and is navigable by vessels of 16 feet (4^{m}9) draught at any state of the tide. The western entrance is deep in the fairway.

On exceptional occasions, during winter, the sea level may fall as much as 5½ feet (1^{m}7) below the datum to which the soundings are reduced; this usually happens after strong north-westerly or northerly winds, and may be caused by increased atmospheric pressure.

Aspect.—There are three ranges of hills in the vicinity of Weihaiwei; the hill sides are either barren rock or are planted with dwarf pine and scrub oak. The valleys are mostly undulating country intersected by gullies and mountain river beds; the streams are all torrential and choke up the valleys with sand and débris from the hills. For nine months of the year these river beds are dry.

Macdonald hills are a range of barren hills rising to a summit, 694 feet (211^{m}5) high, situated about 3½ miles south-westward of Three Peaked point, and terminate westward in Macgregor valley.

Seymour range, at the head of the bay, is in the form of a crescent; the sides of the hills are much broken by ravines. Mount Goschen (*Lat. 37° 29′ N., Long. 122° 05′ E.*), the principal peak, is situated about 4 miles south-westward of Pei shan point, and Fung hwang shan, the summit of this range, is situated about one mile south-westward of Mount Goschen.

Fitzgerald range, on the northern side of the bay, takes the form of a crescent; Mount Richards, its highest peak, is situated about 1¼ miles west-north-westward of Pei shan point.

Valley hill, about 1½ miles northward of Mount Goschen and at the back of the walled town of Weihaiwei, is conspicuous; from this hill undulating slopes extend westward and form a low ridge between Seymour and Fitzgerald ranges. In the valleys on each side are several scattered villages, and the whole is cultivated. Nearly 3½ cables eastward of the summit of Valley hill is a tower or joss-house, which was reported, in 1935, to be illuminated at night.

Liu kung tao appears barren from seaward, but its slopes have been planted with trees. Centurion hill, with a signal station on it,

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Charts 3025, 2823.

is the highest part, and from this hill ridges run through the middle of the island.

Chart 2823.

Eastern entrance.—Coast.—Dangers.—The coast between Chao pei tsui (page 338) and Lung miao tsui, about 2 miles south-westward, is indented by two bays, Dorward bay and Ward bay; on Lu chueh tsui, the point between them, are the ruins of a fort. A reef extends about 2 cables from the coast close eastward of Lu chueh tsui, and terminates in a rock 4 feet (1m2) high. Ward rocks, on the western side of Ward bay, extend nearly half a mile offshore, and the outer one dries 2 feet (0m6).

Yangka bay, entered between Lung miao tsui and White Sandy point, about 2¼ miles westward, is free from dangers; White Sandy point is conspicuous owing to its beach of white sand, and a rocky ledge extends about 2 cables eastward from it. Macgregor valley, at the head of the bay, is flat, highly cultivated, and a few streams flow through it; there are some salt pans near the shore of the bay.

Chart 3025.

Flagstaff point.—Light.—Flagstaff point or Tsu tau kaku, about 2¾ miles northward of White Sandy point, becomes an islet at high water; a rocky ledge, with some heads on it from one to 3 feet (0m3 to 0m9) high, extends about three-quarters of a cable from the point. About 3 cables south-westward of Flagstaff point is Chin hsien ting, a hill with a tower on its summit.

A light is exhibited, at an elevation of 53 feet (16m2), from a white iron column, 24 feet (7m3) in height, on Flagstaff point; there is a white dwelling near the light-structure.

Islet and dangers in the eastern entrance.—Zhi tao or Sun island (*Lat. 37° 29′ N., Long. 122° 12′ E.*), about 2 miles north-westward of Chao pei tsui, is rocky, 41 feet (12m5) high, and was formerly a fort; a beacon, consisting of a white cairn, stands on its northern side, but in 1936 it was reported that this beacon had fallen down and was not conspicuous. Zhi tao is surrounded by a reef, which partly dries, extending fully 1½ cables from its northern and southern sides. Davy rocks, about 1½ cables south-eastward of Zhi tao, are awash and are not readily seen.

Hu an lok rocks lie on the northern side of the eastern entrance, and extend about 4 cables east-south-eastward from the eastern extremity of Liu kung tao. These rocks are above water and lie on reefs which dry; they are divided into two parts, separated by a channel with a least depth of 7 feet (2m1).

Liu kung tao.—Lights.—Buoys.—A fog signal is occasionally made from the eastern extremity of Liu kung tao.

Among the buildings on the southern side of the island is the Masonic hall, a conspicuous drab-coloured building with a dark roof. A signal station, painted white, with a flagstaff on its eastern side, is situated close south-westward of the canteen and is conspicuous. A square tower, about midway between East village and the eastern extremity of the island, is a conspicuous object. ' East village, situated in the middle of the south coast of the island, is occupied entirely by Chinese.

There are several piers along the western part of the south coast of Liu kung tao. The Military pier, the easternmost of these, is in ruins, and it is dangerous to approach in boats owing to large blocks

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Chart 3025.

of masonry lying submerged near it; a white stone beacon stands in the centre of the broadest part of this pier. Stone (Cowan) pier is situated about a quarter of a mile westward of the Military pier; a beacon, from which a light is exhibited occasionally, stands on its outer end.

Iron pier is situated nearly 3 cables westward of Stone pier, and there is a depth of 19 feet (5m8) at its outer end; boats can land at two sets of steps at its inner end at any state of the tide. In 1935 this pier was reported to be in a bad state of repair. A light is exhibited, at an elevation of 20 feet (6m1), from a post on the head of Iron pier. There is an automatic tide gauge on the western side of the inner part of this pier.

Observatory island is connected by a causeway to the south-western extremity of Liu kung tao; this causeway forms the northern side of a boat camber, which nearly dries. A large black and white notice board, with "Cable" inscribed on it, stands near the western end of Observatory island, and marks the landing place of the cable from the mainland. A light is occasionally exhibited on the southern side of the entrance to the boat camber.

Three can buoys mark the edge of the shoal water extending from the south-western end of Liu kung tao; No. 1 buoy is moored about three-quarters of a cable westward of Observatory island and is black; No. 2 buoy is moored about 1½ cables westward of the entrance to the boat camber and is black and white chequered; No. 3 buoy is moored about 1¾ cables southward of the entrance to the boat camber and is black. A mooring buoy for targets is moored about a cable westward of the head of the Iron pier.

Mandarin bay is on the north-eastern side of Liu kung tao. Gaunt islet lies about half a cable off Gaunt point, the north-western entrance point of the bay, and is rocky.

The north coast of Liu kung tao between Gaunt point and Kwoa pu, about three-quarters of a mile west-north-westward, is indented with several coves, one of which is named Kung cove. A pinnacle rock, with a depth of 18 feet (5m5), lies close off the western side of Kwoa pu.

Four Funnel bay lies on the western side of Liu kung tao. Causeway cove lies in the southern part of this bay and on the eastern side of Observatory island; Cayley rock, which dries 2 feet (0m6), lies in the entrance to this cove.

Western entrance.—The western entrance to Weihaiwei anchorage is between the western end of Liu kung tao and a chain of islands and rocks which extends fully three-quarters of a mile north-eastward from Pei shan point, and the coast about one mile south-westward of that point. Outer island (*Lat. 37° 32′ N., Long. 122° 10′ E.*), the outermost of these islands, is situated nearly 9 cables north-north-westward of Kwoa pu, and has a white stone beacon on it, 39 feet (11m9) in height; a rock, 20 feet (6m1) high, lies close north-westward of Outer island, and a rock, 5 feet (1m5) high, lies close southward of the island. Some rocky pinnacles, from one to 2 feet (0m3 to 0m6) high, lie about one cable south-westward of Outer island.

Round island, nearly 4 cables south-westward of Outer island, is dome-shaped and covered with grass; there is a clear, deep passage between this island and the rocky pinnacles lying south-westward of

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Chart 3025.

Outer island. There is foul ground, on which are Hei tao and another islet, between Round island and Pei shan point. *See* view on chart 2823.

Grafton point is situated nearly 2 cables southward of Pei shan point, and between the former and King Hall point, about one mile south-westward, are three indentations in the coast. In Weigall cove, the middle one of the three, is a stone jetty, the outer end of which just dries; a reef, with some rocks above water on it, extends nearly one cable from the south-western entrance point of Weigall cove. A large black and white notice board, surmounted by a white diamond, stands on King Hall point or Tsua chii tai.

Narcissus bay.—Lights.—Narcissus bay, entered between King Hall point and Flagstaff point (page 340), is mostly used by junks; large fleets of junks come from the southern shore of the Gulf of Pohai and places in the locality to fish when the herring season commences in spring. Weihaiwei is a walled town at the head of the bay. The agents of the shipping firms and banks reside at Mato, a village on the northern shore of the bay. Weihaiwei is a Treaty port. There is a stone pier at Mato, and steamboats can proceed alongside it at any state of the tide; two lights are exhibited from a small white beacon and iron post at the head of this pier. Victory pier is situated about 3 cables westward of Mato pier, and two lights are exhibited on an iron post on its head.

Anchorages.—Vessels of deep draught can anchor south-westward of the south-western extremity of Liu kung tao, but it must be borne in mind that the depths decrease suddenly between the Iron pier and Observatory island; a good berth in winter is in a depth of about 31 feet (9^{m}4), good holding ground, with the head of the pier bearing 068°, distant 2¼ cables. Vessels with a draught of not more than 16 feet (4^{m}9) can anchor anywhere southward of Liu kung tao. There are three mooring buoys south-eastward of the Iron pier.

In Four Funnel bay the bottom is soft and vessels sometimes drag.

The usual berths for His Majesty's ships are shown on the plan by letters or numerals in small circles.

Anchorage can be obtained off Mato, in Narcissus bay, in depths of from 12 to 18 feet (3^{m}7 to 5^{m}5); this anchorage is frequented by local steam vessels.

Merchant vessels of deep draught usually anchor off Weigall cove, northward of the prohibited anchorage and westward of the fairway as defined by the *white* sector of Flagstaff point light, in depths of from 27 to 33 feet (8^{m}2 to 10^{m}1). Merchant vessels of light draught usually anchor south-eastward of King Hall point, in depths of from 21 to 23 feet (6^{m}4 to 7^{m}0).

Northerly winds usually set in early in September, and anchorage in the western entrance is not recommended then. With strong winds eastward of north or south a swell sets through the eastern entrance, rendering the anchorage uncomfortable and raising a short sea which is troublesome to boats.

Prohibited anchorage.—Anchorage is prohibited between Observatory island (*Lat. 37° 30′ N., Long. 122° 10′ E.*) and King Hall point within the pecked lines shown on the charts.

Tidal streams.—The east-going stream at Weihaiwei anchorage begins 2 hours before high water, and the west-going 4 hours after

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Chart 3025.

high water; but the times of the turning of the streams depends greatly on the direction and force of the wind; with strong south-easterly and easterly winds the west-going stream continues all day, as does the east-going stream after strong north-westerly winds.

Generally, the streams follow the direction of the coast and attain a rate of 1¼ knots at Weihaiwei anchorage. The duration of slack water is usually from one to 2 hours.

The west-going stream divides at Hu an lok rocks, where there are eddies and overfalls; the northern portion follows the coast, and the southern portion passes southward of Liu kung tao and turns northward through Western entrance. These streams meet at Round and Outer islands, causing eddies, and the combined stream runs at the rate of 2¼ knots off the coast north-westward; this stream is much weaker 5 miles off-shore.

The east-going stream divides at Outer island into two branches, one passing northward, and the other westward and southward, of Liu kung tao, which meet again at Hu an lok rocks.

The tidal streams close to the south coast of Liu kung tao turn considerably earlier than they do at the anchorage, and attain a rate of 3 knots at spring tides close off the Iron pier; the west-going stream is the stronger.

The tidal streams along the coast in the vicinity of Weihaiwei run in the opposite direction to those at some miles off the land, where the west-going stream begins one hour before high water, and the east-going stream 5 hours after high water.

Caution is necessary when approaching the land in the vicinity of Weihaiwei from the northward in thick weather, as the line of change in the tidal streams along the coast is difficult to determine and considerable error in the estimated position may result, the error usually being eastward or westward.

Directions.—Vessels making for Weihaiwei anchorage by the eastern entrances should pass not less than half a mile southward of Hu an lok rocks and not less than half a mile northward of Zhi tao, and thence to the anchorage. After passing Zhi tao the depths decrease to about 18 feet (5^{m}5) over an extensive flat extending southward from Liu kung tao, but increase again as the western end of this island is approached. At night, vessels should keep in the white sector of Flagstaff point light until the light on the head of the Iron pier bears about 310°, when the anchorage may be steered for.

Vessels can also pass southward of Zhi tao, giving Davy rocks a berth of a quarter of a mile, and thence steer north-westward for the anchorage.

Vessels proceeding to the anchorage off the south-western extremity of Liu kung tao by the western entrance should pass about midway between Kwoa pu and Outer island, and thence about 3 cables off the western side of Liu kung tao and 2 cables westward of Observatory island, continuing southward until an old fort near Chao pei tsui (chart 2823) is in line with the beacon on Zhi tao (*Lat. 37° 29′ N., Long. 122° 12′ E.*), bearing 124°, which leads to the anchorage. The western entrance must always be used by vessels of deep draught.

Harbour facilities.—Fresh provisions are plentiful.

A small stock of coal is maintained for H.M. ships, and there is usually a small stock for the use of merchant vessels.

Charts 2823, 3457, 1255, 1256, 1262.

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Chart 3025.

There are two small hospitals.

There is regular steamship communication with Hong Kong, Shanghai, Chefoo, and Tientsin. Liu kung tao is connected to the general telegraph system.

Shipping.—In 1935, 1,235 steam vessels with an aggregate of 1,433,703 tons entered the harbour.

COAST.—Shang yai sha tan, entered between Round island and Shang hing point, about half a mile north-north-westward, is open to north-easterly winds, which raise a heavy sea; it is mostly used by fishing junks, and there are two villages at its head. Peaked point, about a quarter of a mile northward of Shang hing point, is the eastern extremity of Ku shi, a cliffy islet connected to the mainland by a rocky ridge.

Chart 2823.

Liu chu bay, entered between Ku shi and Mau to shan, a bold headland about one mile north-westward, is deep, but it is not recommended as an anchorage; a rock, 3 feet (0m9) high, lies about 2 cables south-eastward of Mau to shan. Ching tsu shan is a steep-to point about 1¼ miles west-north-westward of Mau to shan, the coast between being rugged and indented by several small bays. A conspicuous white stone monument stands on the summit of a hill, 361 feet (110m0) high, situated about 3 cables south-eastward of Ching tsu shan.

Pu to han.—Island and dangers.—Pu to han, entered between Ching tsu shan and Yaoyao (Yau yuen) tsui, about 2½ miles westward affords good anchorage with offshore winds, but a heavy swell sets in with northerly and north-westerly winds. Yaoyao tsui is the extremity of a tongue of land which forms the western side of the bay, and rises to Dawson hill, a well-defined peak situated about 1½ miles south-south-eastward of the point.

Chu tao lies about three-quarters of a mile north-eastward of Yaoyao tsui, and its coast consists partly of scarped cliffs. A rock, which dries 6 feet (1m8), with irregular depths around, lies about one cable off the north-east point of the island; a rocky patch, with a depth of 2½ fathoms (4m6) over it, lies about 2 cables eastward of this rock. A 1¾-fathom (3m2) patch lies about a quarter of a mile southward of the south-east point of the island, and there is foul ground between this patch and the coast south-westward.

The best anchorage is in the middle of a bight on the eastern side of the bay. There is no good landing place in the bay.

Obstruction reported.—An obstruction, not dangerous to surface craft, was reported in 1936 nearly 2½ miles north-eastward of Chu tao.

Chart 1260.

Coast.—Hsiao shih tao (*Lat. 37° 32′ N., Long. 122° 00′ E.*) is an islet connected to a point situated nearly 3½ miles south-westward of Yaoyao tsui. Between these two points are two bays, Matsu kan and Shitau han, which have sandy beaches and are separated from each other by a headland 367 feet (111m9) high.

Between Hsiao shih tao and White Rock point, about 17½ miles westward, the coast consists of a sandy beach backed by a sandy plain. About 1¾ miles southward of Hsiao shih tao is a rocky point 131 feet (39m9) high, and immediately southward of this point is the entrance

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Chart 1260.

to Hwangpu chiang. Cap point is situated about 1¾ miles south-westward of the rocky point and is the eastern entrance point of Shwangtao chiang, an inlet which dries except for a narrow gully; its entrance is obstructed by sandbanks and two rocks about 30 feet (9m1) high. Small junks enter the islet, and some anchor outside the entrance. About 5 miles eastward of White Rock point is a lagoon which can only be entered by small junks at high water.

There are a few isolated, conspicuous hills along this part of the coast, rising a few miles inland to a rugged, mountainous range; a spur from these runs down towards the coast, and terminates in the conspicuous North-west hill, situated nearly 5 miles south-eastward of White Rock point.

There are very regular depths of from 9 to 11 fathoms (16m5 to 20m1) off the coast between Hsiao shih tao and White Rock point, but about half a mile offshore the bottom rises steeply and sounding gives no warning of the approach to land. For tidal streams, *see* notes A and B on chart 1260.

White Rock point is the north-eastern extremity of Yangma tao, a hilly island separated from the mainland by Lungmen flats, which dry; Ta shan, the highest hill on the island, is situated near its south-western end. White Rock point consists of cliffs from 40 to 50 feet (12m2 to 15m2) high, and close off it is Lien shih, a white rock 55 feet (16m8) high. Close southward of the north-eastern end of Yangma tao is the entrance to a channel used by junks, which leads through the sand flats to Lungmen harbour; large junks ground within the entrance at low water.

Lungmen harbour.—Lungmen harbour, between the south-western end of Yangma tao and the mainland, dries over the greater part. It is entered by a channel close off the south-west point of Yangma tao, where there is a least depth of about 14 feet (4m3) in the fairway; this channel, however, varies from time to time, and it should be examined and buoyed before entering. Within the entrance the channel through the flats runs in a general easterly direction, and there are depths of from 3 to 4 fathoms (5m5 to 7m3) in places. This channel is sheltered from all winds and is nearly half a cable wide for about 4 cables within the entrance; the landing place is by a joss-house on the south point of Yangma tao, which is steep-to. The principal village on the island is situated close north-eastward of this point.

A channel about 7 miles in length, through the southern part of Lungmen flats, leads to Ninghai chow, where there is a pagoda visible from seaward.

CHEFOO HARBOUR.—Chefoo or Yentai harbour lies in the bay entered between Ma shan, situated about 2½ miles westward of the south-west point of Yangma tao, and Chefoo cape, about 9½ miles north-westward; it is a Treaty port. The harbour is partly sheltered from easterly winds by Kungtung tao and the adjacent islands, and is available for vessels of any size, but the outer anchorage, for vessels of deep draught, affords little shelter with northerly gales.

Ice.—In January, 1878, vessels were several times frozen in at the anchorage; floating ice, pieces of which were from 4 to 5 feet (1m2 to 1m5) thick, extended for miles in the offing and navigation was impeded. In February of that year a steam vessel was beset for

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Chart 1260.

three or four hours in the ice northward of Kungtung tao; this winter was exceptionally cold.

Off-lying islands and dangers.—Light.—Buoy.—North rock lies nearly 8 miles northward of White Rock point and is 85 feet (25m9) high; on westerly bearings it appears round, with a smooth top sloping southward, but on southerly and easterly bearings it is wedge-shaped. A small rock, which dries about 9 feet (2m7), lies about 3 cables north-eastward of North rock. These rocks are the outermost dangers in the approach to Chefoo; they are both steep-to, with depths of 9 fathoms (16m5) around.

Double island, about 2½ miles south-westward of North rock, appears to be divided into two parts when seen from the eastward; its northern part is wedge-shaped, and its southern and highest part is an irregular mound 175 feet (53m4) high. Shoal water extends about 3 cables from its south point.

South-east island lies about 1¾ miles southward of Double island. Three high rocks and two rocks awash lie between South-east island and the east point of Kungtung tao, situated about one mile west-north-westward.

Kungtung tao is 205 feet (62m5) high in the northern part, its central part is low and sandy, except for a slight elevation in the middle, and there is a hillock, with a flagstaff on it, on its south-western extremity; there is a village on the low part of the island. Kungtung tao spit, which partly dries, extends nearly three-quarters of a mile southward from the south-west point of the island; a red spar buoy, surmounted by a black sphere, is moored close off the extremity of this spit.

A light is exhibited, at an elevation of 242 feet (73m8), from a circular tower, 45 feet (13m7) in height, painted red and white in horizontal bands, situated on the northern part of Kungtung tao. A fog signal is sounded from the lighthouse.

An island, 200 feet (61m0) high, lies about a quarter of a mile northward of Kungtung tao, with shoal water between; Finger rock, a conspicuous vertical column, lies close off the west point of this island.

A chain of islands and reefs extends about 2½ miles north-westward from Kungtung tao; amongst these are Shag island and Ku tao. A sandy spit, which nearly dries, extends about 4 cables southward from Ku tao. Stick-up rock, at the north-western end of the chain, is a vertical pillar 61 feet (18m6) high.

Stick-up rock (*Lat. 37° 35′ N., Long. 121° 28′ E.*) in line with the hillock on the north-western end of Ku tao, bearing 340°, leads about half a mile westward of Kungtung tao spit; *see* view facing this page.

Chart 1260, plan of Chefoo or Yentai inner harbour.

Outer harbour.—Coast.—Ma shan is a hill on the coast, with a ruined tower on its summit. Between Ma shan and Knob point, a small promontory about 5 miles north-westward, the coast is low and sandy. Nearly 1¾ miles south-westward of Knob point is a peak 1,315 feet (400m8) high, and about 1½ miles westward of this peak is a ridge with a monument on its summit. Middle point, about 1¼ miles north-westward of Knob point, has a fort on it, and a small pier extends from the western side of this point.

Charts 1255, 1256, 1262.

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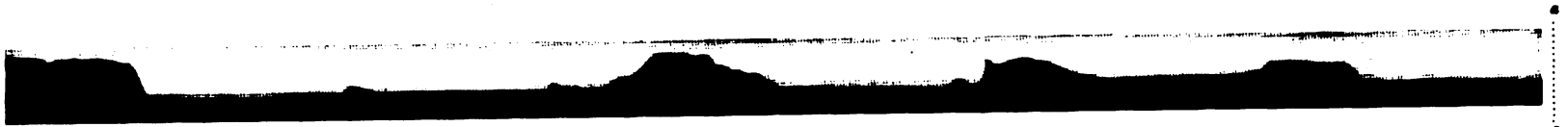
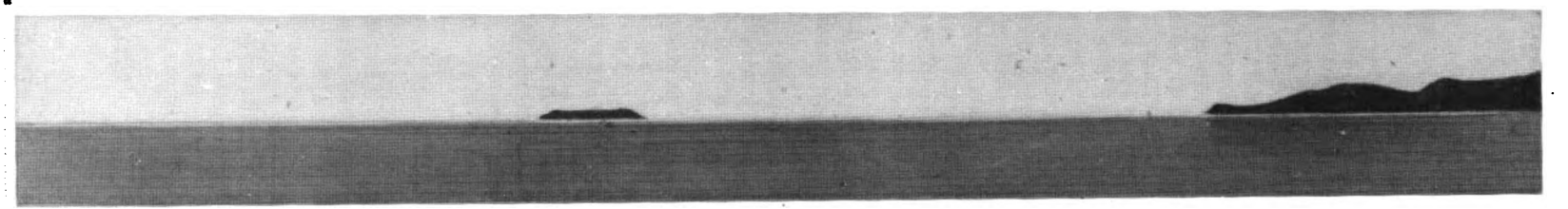


Chefoo cape.

Stick-up rock in line with hillock on Ku tao, bearing 340°.



Kungtung tao.

View, in two parts, of Chefoo harbour: mark for clearing Kungtung tao spit.

(Original dated 1869)

Chefoo peak, bearing about 140°, 6 miles.

Chefoo bluff and land southward.

(Original dated 1872).

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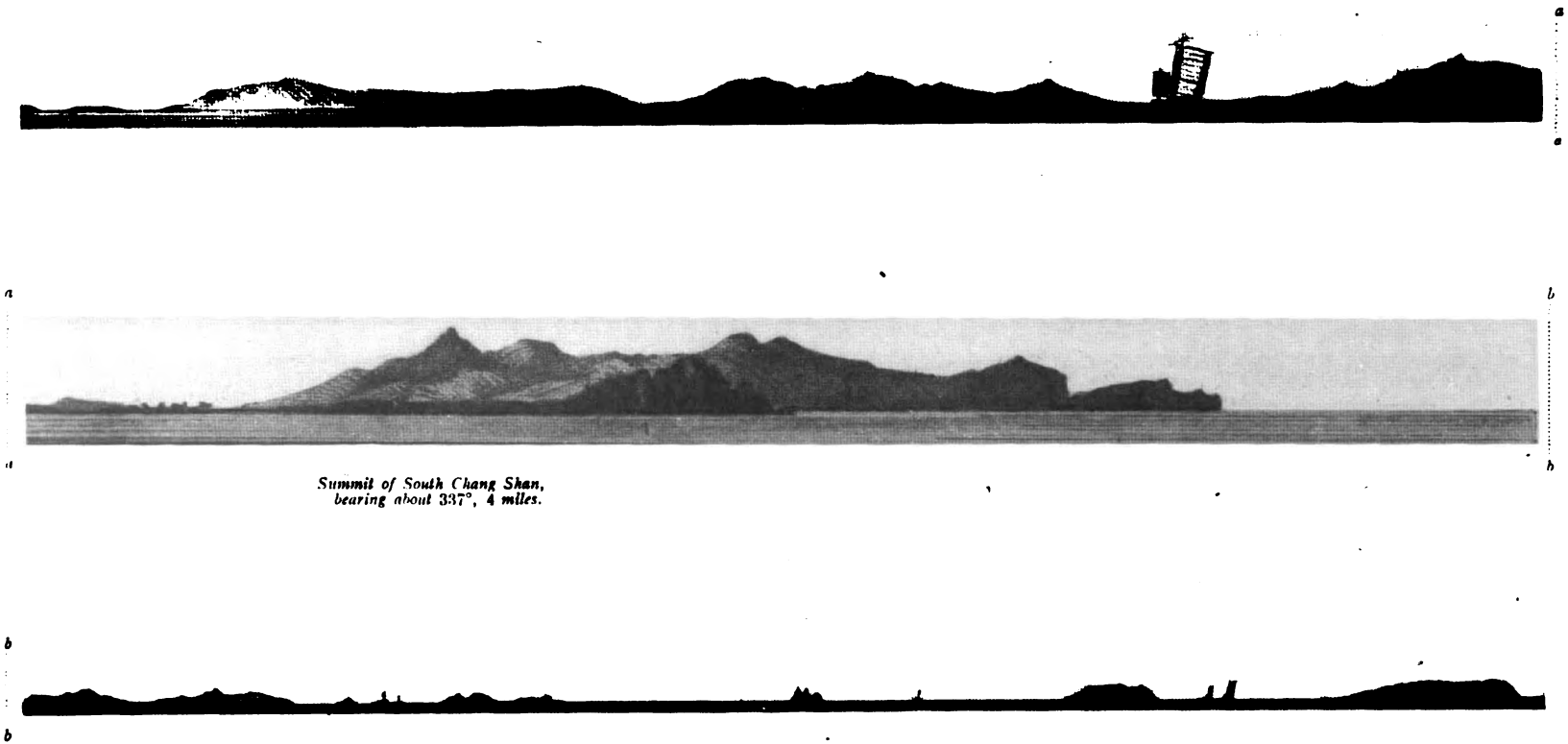
To face page 347.



View, in three parts, of Miao tao group from Miao tao strait.

(Original prior to 1880).

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Chart 1260, plan of Chefoo or Yentai inner harbour.

Tower point, situated about 1½ miles west-north-westward of Middle point, rises steeply to the summit of Tower hill. A rock, which dries, lies about half a cable southward of Tower point, and is marked by a black beacon surmounted by a sphere.

Village bay, entered between Tower point and Chefoo cape, is mostly shallow; Chefoo village is situated on the northern shore of this bay. Chefoo cape is the eastern extremity of a hilly peninsula, named Chefoo bluff, connected to the mainland by a low isthmus which forms the western side of Village bay. The peninsula rises steeply to a narrow ridge, and Chefoo peak, the summit of this ridge, has a double top; *see* view facing page 346, and view on chart 1260. North-west rock, above water, lies about 6 cables east-north-eastward of the north-west point of the peninsula; Sentry rock, 50 feet (15m2) high, lies about one cable off Chefoo cape, and is steep-to, although the water for some distance off the rock is often discoloured. A wireless mast is erected on the sand hills at the head of Village bay, and there is a flagstaff on the isthmus connecting Chefoo bluff with the mainland.

Anchorages.—Vessels of deep draught can anchor south-westward of Ku tao, but this anchorage is open to strong north-westerly and northerly gales, which are experienced in autumn and winter; the holding ground throughout the harbour is very good, however, and it is unusual for vessels to drag.

Small vessels can anchor in Village bay. Northerly gales send in a heavy swell, and in winter the sea is so heavy during these gales that working cargo in the outer harbour is entirely suspended.

Prohibited anchorage.—Owing to the existence of submarine cables, anchorage is prohibited southward of a line drawn from Tower point to South-east island.

Inner harbour.—The inner harbour, in the southern part of Village bay, is formed by a mole and a detached breakwater; it has two entrances, one at each end of the breakwater, and is safe and capacious. The northern part of the harbour and both entrances are dredged to a depth of 20 feet (6m1); alongside the breakwater and alongside the quay at the outer end of the mole are areas dredged to a depth of 25 feet (7m6), where large vessels can berth; in the area alongside the breakwater are two mooring buoys for vessels of over 400 feet (121m9) in length to moor head and stern.

There are 15 mooring berths in the inner harbour. Nos. 1 to 9 are for vessels up to 320 feet (97m5) in length; Nos. 10, 12, and 14 are for vessels up to 260 feet (79m2) in length; Nos. 11, 13, and 15 are for smaller vessels and launches. These berths are all indicated by the intersection of lines given by pairs of transit beacons erected on the mole and breakwater, respectively; each of these beacons consists of an iron tripod surmounted by a staff and diamond. There are also white transit marks on the mole for the position of each anchor. Vessels entitled to occupy berths Nos. 1 to 9 will be signalled from the Customs signal station on Tower hill by the numeral pendants of the Port Signals, China; vessels anchored in these berths are required, from sunrise to sunset, to exhibit the numeral pendant designating the berths they are occupying. When flag N of the International Code of Signals is displayed on the small house on the extremity of the mole it indicates that a vessel is expected alongside, and vessels should not anchor in Nos. 1, 4, and 7 berths, which are the outer berths in the

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Chart 1260, plan of Chefoo or Yentai inner harbour.

inner harbour. A mooring buoy is laid about a quarter of a cable south-eastward of the position of No. 1 berth.

A rock, with a depth of 15 feet (4m3) over it, lies about 2 cables north-westward of Tower hill lighthouse (*Lat. 37° 33′ N., Long. 121° 24′ E.*) and close southward of No. 8 berth. A rock, which dries, lies about 1½ cables north-westward of this lighthouse and about half a cable offshore; it is marked by a black beacon surmounted by a sphere, named North-west beacon.

The depths decrease gradually at the head of the harbour, where there is a boat harbour with a depth of 5 feet (1m5) in the entrance. The most convenient landing place is at Kaiping jetty, on the eastern side of the harbour, where there are several sets of steps with a depth of 4 feet (1m2) alongside. Boats from vessels in the outer harbour entering by the south entrance should give the north coast of Tower hill a wide berth, and should pass outside North-west beacon.

Strong winter gales greatly affect the depths in the harbour; under very abnormal conditions, with westerly gales and ice, less depths than are shown on the chart have been known.

Lights.—A light is exhibited, at an elevation of 175 feet (53m3), from a white lantern on a white building situated within the grounds of an old temple on Tower hill.

A light is exhibited, at an elevation of 28 feet (8m5), from a red iron framework structure on the southern end of the breakwater. A light is exhibited, at an elevation of 18 feet (5m5), from a black iron framework structure on the northern end of the breakwater.

A light is exhibited, at an elevation of 18 feet (5m5), from a red iron framework structure on the head of the mole.

Pilotage.—The pilotage ground for Chefoo is within a radius of 2 miles from the breakwater. Pilotage is optional.

Directions.—The mountain, 1,315 feet (400m8) high, situated nearly 1¾ miles south-westward of Knob point, bearing 248°, leads to the southern entrance of the Outer harbour, passing fully half a mile southward of Kungtung tao spit; after rounding this spit, proceed as convenient for the anchorage. The southern entrance of the outer harbour has a least depth of 4½ fathoms (7m9) in the fairway.

Vessels of deep draught must use the northern entrance, passing between Sentry rock and the shoals extending north-westward from Ku tao, thence anchoring south-westward of this island.

At night, a *white* sector of Tower hill light leads through each entrance.

Vessels proceeding into the inner harbour, and using the southern entrance, must give the end of the breakwater a berth of at least a quarter of a cable; the coast by Tower point must be given a berth of fully half a cable. When a red flag is exhibited at the southern end of the breakwater vessels must proceed dead slow. The southern entrance to the inner harbour is intended primarily for the use of inward-bound vessels, but outward-bound vessels may use it if no inward-bound vessel is seen approaching.

Harbour regulations.—The following are extracts from the Harbour regulations for Chefoo:—

1.—The term vessel in these regulations refers to vessels of foreign type.

2.—The control of the Harbour authorities extends over the water comprised within a line drawn from Chefoo cape to the north-eastern

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Chart 1260, plan of Chefoo or Yentai inner harbour.

end of Kungtung tao, and from the eastern end of this island in a southerly direction to the coast immediately eastward of Ma shan (*Lat. 37° 27′ N., Long. 121° 31′ E.*). The area contained within the breakwater and the mole is termed the Inner harbour, while the remaining portion is termed the Outer harbour.

3.—The anchorages for vessels are :—

(*a*) For vessels other than those provided for in (*b*) and (*c*) : within the inner harbour or as near thereto as draught and available space permit.

(*b*) For vessels carrying explosives, mineral oil, etc. : not nearer than half a mile to the inner harbour or the shore and as near to that limit as draught and available space permit.

(*c*) For quarantine purposes : outside the inner harbour and as directed by the Harbour master.

5.—Incoming vessels have right of way in the entrances to the inner harbour.

6.—Vessels shall moor in accordance with the instructions received from the Harbour master, and shall not shift their berths without special permission, except when outward bound after having obtained their clearance papers or through stress of weather.

7.—Applications for berths or for permission to shift berth must be made at the Harbour master's office by the master, or by an officer or agent of the vessel, when the necessary instructions concerning the berth will be given. If a vessel be instructed by the Harbour master to shift her berth she shall do so.

8.—Transient vessels entering the port must be examined by the Harbour authorities before any communication with the shore or other vessels is allowed, or any passenger or member of the crew are allowed to go on shore or cargo to be landed.

9.—No cargo shall be loaded or unloaded, nor shall any passengers or crew land or embark at places other than those appointed by the Harbour authorities.

12.—Vessels arriving with mineral oil, or cargo of a highly inflammable nature, shall, on approaching the port, display a red flag at the fore, anchor as provided in Article 3 (*b*), and remain there until all such cargo has been discharged or permission given to take up another berth.

14.—Vessels having any infectious disease on board or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died, of an infectious disease, shall, on approaching the port, display the quarantine flag, anchor as provided for in Article 3 (*c*), and keep the flag flying until pratique has been granted.

17.—Vessels within the inner harbour must either moor or secure to a buoy ; they may not lie at single anchor without special permission from the Harbour master.

Chefoo.—The town of Chefoo or Yentai stands on the sandy shore of a small bay in the inner harbour immediately westward of Tower hill. On the southern slope of the hill are some European houses, the British Consulate being nearest the summit, but many foreign residences, enclosed by walls, are also built along the sandy beach between Tower point and Middle point ; the Russian Consulate, with a tall flagstaff, is about midway between these two points. The Custom house and jetty, where all imports must be landed, is situated southward of Kaiping jetty.

Charts 1255, 1256, 1262.

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Chart 1260, plan of Chefoo or Yentai inner harbour.

The normal native population was about 100,000 in 1933, and there were about 1,000 foreigners.

There is a large and increasing fruit growing industry in the country around Chefoo. The manufacture of silk is carried out on a large scale, and there is an extensive fishing industry.

Harbour facilities.—Fresh provisions are plentiful. Water can be obtained from lighters.

There is a stock of coal, which is shipped from lighters. A small stock of fuel oil is maintained.

There is regular steamer communication with Tientsin, Weihaiwei, Shanghai, Dairen and Antung. Chefoo is connected to the general telegraph system, and there is a local telephone service. There is a W/T station, *see* page 42.

There are several hospitals.

Storm signals of the China Seas Signal Code are displayed at the signal station on Tower hill (*Lat. 37° 33′ N., Long. 121° 24′ E.*); *see* page 27.

Shipping.—In 1935, 2,399 steam vessels with an aggregate of 2,188,245 tons entered the harbour.

Chart 1255.

COAST.—Off-lying shoal.—The coast between the north-western extremity of Chefoo bluff and Sloping point, about 10 miles west-north-westward, forms a bay with a sandy beach.

A rocky patch, with a depth of 4¼ fathoms (7m8) over it, was reported, in 1919, to lie about 12½ miles north-north-eastward of Chefoo cape. This danger was unsuccessfully searched for in 1920.

Low point, with a conspicuous hill, 334 feet (101m8) high, close eastward of it, is situated about 12½ miles north-westward of Sloping point. A rock, which dries about 7 feet (2m1), lies about 2½ miles south-eastward of the 334-foot (101m8) high hill and about one mile offshore.

Charts 1255, 1256, 1262.

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CHAPTER IX.

POHAI STRAIT—GULF OF POHAI—GULF OF LIAOTUNG.

Chart 1392.

POHAI STRAIT.—Pohai strait, between the land in the vicinity of Low point (page 350) and the southern extremity of Kwantung peninsula, about 54 miles northward, connects the Hwang hai to the Gulf of Pohai. The Miao tao group, comprising 15 islands and a number of small rocks, lies within a distance of about 35 miles northward from the southern side of the strait.

Tengchow head.—Light.—Dangers.—Tengchow head (*Lat. 37° 50′ N., Long. 120° 44′ E.*), about 8 miles westward of Low point, has steep cliffs and is 243 feet (74^{m}1) high. A light, privately maintained, is exhibited from a brick tower on a joss-house on the head.

Tengchow fu, nearly one mile southward of Tengchow head, is surrounded by a wall, and an opening in its seaward face forms the entrance to a small camber; the entrance, however, is so shallow that even a moderate sea breaks across it, and communication is impossible with strong winds between east-north-east and north-west. There is a post and telegraph office, and steamer communication is maintained with Chefoo.

Tengchow bank extends about 7½ miles west-north-westward from Tengchow head, and has several heads on it with depths of only 4 feet (1^{m}2) over them. It is stated that the depths over Tengchow bank and in this vicinity are constantly changing, and in 1936 it was reported that the depths about 1¾ miles westward of Tengchow head were about 10 feet (3^{m}0) less than those charted.

Anchorage.—Directions.—A rocky ledge, which dries at its outer edge, extends nearly one mile from the coast about 1¾ miles eastward of Tengchow head; to avoid this ledge, from the eastward, the hill, 334 feet (101^{m}8) high, on Low point should not bear less than 106° until the light-tower on Tengchow head bears 243°, when course can be shaped towards the camber, anchoring northward of Tengchow fu in depths of from 3 to 6 fathoms (5^{m}5 to 11^{m}0). The anchorage, which is suitable for vessels with local knowledge, is partially protected from the eastward by the rocky ledge just mentioned, and from the westward by Tengchow bank, but with northerly winds there is a heavy breaking sea, which renders the anchorage unsafe.

Miao tao strait.—Light.—Dangers.—Miao tao strait is bounded southward by Tengchow head and Tengchow bank, and northward by Chang shan, Miao tao, and Tahei shan, the southernmost islands

Charts 1255, 1256, 1262.

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Chart 1392.

of the Miao tao group; this strait is deep in the fairway and is navigable, but there are much better channels between the islands northward of Chang shan. *See* view facing page 347.

Chang shan is divided into two parts by a narrow shingle isthmus; both parts are hilly, and Cairn hill, the summit of North Chang shan, is 659 feet (200m9) high. The east coasts of North and South Chang shan are bold, cliffy, and steep-to, except for a few rocks lying close offshore. Chang shan tail is a sandy spit which extends about 1¼ miles southward from Spit point, the south point of South Chang shan; the inner part dries, and there is a depth of 2 fathoms (3m7) over the extremity of the outer part. A tidal overfall over the spit extends, like breakers, for a considerable distance across Miao tao strait. A light, privately maintained, is exhibited from a white tower on Ship point, the south-western extremity of South Chang shan.

A bank, with depths of less than 3 fathoms (5m5) and some above-water rocks on it, extends as much as 2½ miles westward from the western side of Chang shan, and Miao tao, an island 319 feet (97m2) high, lies on the south-western extremity of this bank; a 4¾-fathom (8m7) patch and a 5-fathom (9m1) patch lie about one and 2 miles, respectively, southward of Miao tao. Club point is a small peninsula on the western side of Miao tao.

Tahei (Tahi) shan is separated from Miao tao by Hope sound; its western extremity is a cliffy bluff 622 feet (189m6) high. A reef, with some rocks above water on it, extends about 2 miles south-eastward from the south point of the island.

Siaohi shan, Tan ruan tsu, and Ellis island (*Lat. 37° 55′ N., Long. 120° 40′ E.*) lie between Tahei shan and North Chang shan. Rocky shoals and rocks, both sunken and above water, lie within one mile northward of Ellis island, and they should be given a wide berth. The tidal streams set east-south-eastward past the rocks during the rising tide, and westward during the falling tide; there are tide-rips in their vicinity.

In Miao tao strait the tidal stream sets eastward with the rising tide, and westward with the falling tide, but a few miles westward of the strait the reverse is the case. The east-going stream in the strait attains a maximum rate of 3½ knots, and the west-going stream 3 knots.

Anchorages.—Anchorage can be obtained off the south-west coast of South Chang shan, in depths of from 4½ to 6½ fathoms (7m8 to 11m4), sheltered from north-easterly and easterly winds.

Hope sound is a summer anchorage, but it is not recommended in winter, when northerly winds prevail, and the only places where shelter might be obtained, such as southward of Siaohi shan, are too shoal on account of the shallow spit which extends about a mile southward from that island. A part of the east-going stream through Miao tao strait turns northward through the sound, and during northerly winds causes vessels to lie broadside to the swell.

Chart 1392, plan of Tan ruan anchorage.

Tan ruan anchorage lies between the north-western side of North Chang shan and Tan ruan tsu; it can be approached from either northward or southward, the former being the deeper. The southern entrance has a least depth of 3¾ fathoms (5m9) in the fairway; on the eastern side, about 4 cables south-eastward of the south point of Tan ruan tsu and on the edge of the shallow bank which extends westward

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Chart 1392, plan of Tan ruan anchorage.

from Chang shan, are some rocks above water. The southern extremity of Tan ruan tsu is a sandy spit; a flat, with depths of 2 fathoms (3m6) and less, extends about 1½ cables from the eastern side of this island, and a reef, with some rocks above water on it, extends about 2 cables northward from its north-east point.

The anchorage space is about 4 cables wide, with depths of from 4 to 7 fathoms (7m3 to 12m8), stiff mud; it is advisable to moor, as vessels are generally tide rode. This anchorage is secure at all seasons, being protected by the surrounding islands and reefs, and although northerly winds cause a ground swell, it is not enough to inconvenience a vessel of moderate size. Landing can always be effected.

In Hope sound and Tan ruan anchorage the tidal stream sets northward with the rising tide, and southward with the falling tide.

Chart 1392.

Directions.—When entering Miao tao strait from the eastward care must be taken to avoid Chung shan tail; the hill on Low point bearing 106° leads northward of the rocky ledge extending from the coast eastward of Tengchow head and southward of Chung shan tail. When entering from westward Tengchow head should be kept bearing not less than 122°, which leads clear of the outer part of Tengchow bank.

Vessels proceeding to the anchorage off the south-west coast of South Chang shan should keep Temple point, the northern extremity of Miao tao, bearing not less than 330° and open westward of Ship point, which leads westward of Chung shan tail.

Vessels proceeding to the anchorage in Hope sound from Miao tao strait should steer for the western side of Tan ruan tsu bearing 009°, and open westward of Club point; thence pass close westward of Club point, and anchor with Cairn hill bearing 052°, and Temple point (*Lat. 37° 57′ N., Long. 120° 41′ E.*) bearing 094°, or near this position, in depths of from 4 to 5 fathoms (7m3 to 9m1). There is also good anchorage, stiff mud, southward of the eastern extremity of Siaohi shan, as close in as the vessel's draught will permit.

Islands and channels northward of Chang shan.—Dangers.—Lights.—Tachu, the south-eastern island of the Miao tao group, lies about 11½ miles eastward of the north point of Chang shan; it is of barren appearance, and is bordered by a steep-to beach of white shingle. Siaochu shan lies about 2¾ miles westward of Tachu; a shoal, with a depth of 1½ fathoms (2m7), extends nearly half a mile southward from the island, and a reef extends about one cable from its northern end. Shamo tao lies about 2½ miles northward of Siaochu shan; a reef, with a depth of 1¾ fathoms (3m2) on its outer end, extends about three-quarters of a mile from its southern end.

Siaochu shan, bearing 350°.
(Original dated 1872)

Howki lies about 4¼ miles north-westward of the north point of Chang shan; reefs extend about a quarter of a mile from its northern

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Chart 1392.

end. A light is exhibited, at an elevation of 328 feet (100m0), from a black circular tower, 46 feet (14m0) in height, with a white dwelling, situated on the summit of Howki; a fog signal is sounded from the lighthouse.

Howki, bearing 311°.
(Lighthouse not shown.)
(Original dated 1872).

Chang shan channel, between Chang shan and Howki, is the best channel through the Miao tao group, and the only dangers are the rocks extending northward from Ellis island (page 352). The tidal streams set eastward during the rising tide, with a maximum rate of 2¾ knots, and westward during the falling tide, with a maximum rate of 3 knots.

Chin chu mun and Kao shan channel lead northward of Shamo tao and Howki, respectively, and are both deep and free from dangers in the fairway. On the northern side of Chin chu mun are Hesper rock and Tsen leang shu; the former lies nearly 5 miles north-north-eastward of Shamo tao, dries 4 feet (1m2), and at the highest tides is marked only by a break or a ripple; Tsen leang shu, a rock with a depth of less than 6 feet (1m8), lies about 3½ miles westward of Hesper rock. Both these rocks are steep-to.

Tochi (Toki tao) lies with its eastern extremity about 6¼ miles north-westward of Shamo tao, and has a conspicuous peak, 676 feet (206m0) high, in the northern part. A rock lies about 4 cables south-eastward of the east point of the island. Mochang shi is an islet lying on a shoal which extends about a quarter of a mile from the western part of the south coast. Chief bay, on the south coast, affords anchorage to vessels with local knowledge, in depths of from 4¼ to 6¾ fathoms (8m7 to 12m3), sheltered from the northward and partially from the westward. There are villages on the southern and north-eastern sides of the island. A small tower stands on a hill on the east point of Tochi; a light, privately maintained, is occasionally exhibited from this tower at night. Back bay is situated in about the middle of the north-east coast, and several rocks lie within about half a mile offshore northward of this bay. There are tide rips off the north point of Tochi.

Tochi, bearing 342°.
(Original dated 1872).

Kao shan (*Lat. 38° 08′ N., Long. 120° 38′ E.*) lies about 4 miles northward of Howki and on the northern side of Kao shan channel;

Charts 1255, 1256, 1262.

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Chart 1392.

it is a wedge-shaped island, with its highest part on the south-western side. South Tochi channel is the passage between Kao shan and Tochi.

Kao shan, bearing 320°.
(Original dated 1872).

Tachin (Takin tau) lies with its south point nearly 6 miles north-north-eastward of the north point of Tochi; its northern and western coasts are fringed by rocks to a distance of about a quarter of a mile. North Tochi channel, between these two islands, is not recommended on account of Fisherman rock, awash, which lies about 2¾ miles north-eastward of the north point of Tochi; there is generally a tide-rip over this rock when the sea is smooth, but at slack water, or with any sea, the rock is not marked in any manner. Unison rock, with a depth of 1½ fathoms (2m7), lies about 2 miles westward of the south point of Tachin. The east-going tidal stream in North Tochi channel, between Fisherman rock and Tochi, attains a maximum rate of 2½ knots, and the west-going stream a rate of 2¾ knots.

Siaokin tao lies about 1½ miles northward of Tachin, and is separated from it by Takin tau channel; this channel is deep and free from dangers, except for the rocks off the north coast of Tachin. There are tide-rips off the south coast of Siaokin tao, and also off its north point.

Nancheng (South Hwang ching tau) and Peicheng (North Hwang ching tau) lie close together north-eastward of Siaokin tao, and are separated from it by Siaokin tao channel, which appears to be deep and free from dangers. A reef, with a depth of 3½ fathoms (6m4) on its outer end, extends nearly half a mile from a point near the southern end of the west coast of Nancheng, and a reef extends 3 cables northward from the north-west point of this island. A 4½-fathom (7m8) patch lies about 3 cables off the south-west point of Peicheng; a rock, 2 feet (3m7) high, lies about half a mile off the north-east coast, and a 1¾-fathom (3m2) patch lies about 3 cables off the south-east point of the island.

Liau ti shan channel, between Peicheng and the steep-to southern extremity of Kwantung peninsula, about 22 miles north-north-eastward, is deep and free from dangers, so far as is known. For light on Rotetsusan seikaku, *see* page 381.

Chart 1256.

GULF OF POHAI.—The Gulf of Pohai is the southern and major portion of the extensive sea within Pohai strait; the northern portion is known as the Gulf of Liaotung. The Gulf of Pohai is bounded southward and south-westward by the great plain which forms the larger part of the provinces of Shantung and Chihli; several rivers flow into it, the principal being the Hwang ho. The Hai ho, on which is situated the city and treaty port of Tientsin, flows into the north-western part of the gulf; this river forms the approach to the Pei ho, on which is Tungchow, the port of Peiping.

Chart 1262.

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Chart 1256.

There are depths of from 10 to 15 fathoms (18m3 to 27m4) in the middle of the gulf, but these decrease towards the south-western shore, where shoal depths extend many miles. At the head of the gulf easterly and south-easterly winds tend to raise the sea level, and northerly and north-westerly winds tend to lower it.

Ice.—*See* page 23.

Chart 1256, plan of Hope sound, and chart 1392.

Coast.—About 2 miles south-westward of Tengchow head (page 351) is a hill with a stone cairn on its summit, and at the foot is a sandy beach. Davenport point (*Lat. 37° 47′ N., Long. 120° 37′ E.*), about 6¼ miles south-westward of Tengchow head, is low and rocky, and shoal water extends about three-quarters of a mile from it; Dark Bluff (Chart 1255), about 3 miles south-south-eastward of the point, is conspicuous on easterly bearings. Lwankiakow is a large village situated immediately eastward of Davenport point, and behind the village is a low hill with an artificial mound on it; there is a conspicuous tree, with a white tower near it, in the village. A breakwater of large stones extends from the coast off Lwankiakow, and junks moor under its shelter, probably lying aground at low water. There was reported in 1914, to be anchorage, in a depth of 4 fathoms (7m3), stiff mud, with the extremity of Davenport point bearing 270°, and the mound on the hill behind Lwankiakow in line with the white tower, bearing 191°; landing can be effected on a sandy beach, sheltered by the breakwater. There is a post and telegraph office in the village, and Lwankiakow is a port of call for the small coastal steamers running between Chefoo and Lungkow.

Chart 1255.

The coast between Davenport point and Chimatao promontory, about 19 miles west-south-westward of Davenport point, is low and sandy. Hwang point is situated about 8 miles west-south-westward of Davenport point, and has a small sand-hill on it; Knob hill is situated about 3 miles east-south-eastward of Hwang point. Ye shan, about 11 miles southward of Knob hill, and Keu shan, about 8 miles westward of Ye shan, are the highest peaks of a mountain range; a ridge extends north-westward from the latter, terminating in a steep, sharp peak, 1,420 feet (432m8) high, situated about 12 miles south-westward of Knob hill.

Off-lying island and dangers.—Sang tao lies about 1¼ miles northward of Hwang point, and there is a village with a temple on its south-eastern part. The island is surrounded by reefs, some of which dry out 2 or 3 cables, with uneven ground outside them; a detached reef, which dries about 3 feet (0m9), lies about 7 cables south-eastward of the north-east point. The passage between Sang tao and the mainland has only been partially examined.

Sand islet lies about half a mile north-westward of Sang tao, and shoal water extends about half a mile north-eastward from the islet. A rock, on which a vessel with a draught of 9 feet (2m7) struck, was reported, in 1901, to lie about 2 miles northward of Sand islet, and a reef was reported, in 1901, to lie nearly the same distance north-westward of the islet; in heavy weather the sea breaks on both the rock and the reef. As the positions of these shoals are doubtful, and as other rocks may exist, vessels should keep clear of this area.

Chart 1262.

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Chart 1255.

Chimatao promontory.—Light.—Chimatao promontory terminates in a small range of hills, 205 feet (62^{m}5) high, connected to the mainland by a low sandy isthmus. The northern side of the isthmus is steep-to, but reefs and rocks extend nearly 4 cables westward from the north-west point of the promontory, which is cliffy; the south-western end of the promontory, where there is a village at the foot of the hills, is low.

A light is exhibited, at an elevation of 198 feet (60^{m}4), from a white hexagonal brick tower, 37 feet (11^{m}3) in height, situated near the north-western extremity of Chimatao promontory (*Lat. 37° 41′ N., Long. 120° 14′ E.*).

Lungkow bay.— Lights.— Buoys.— Lungkow bay lies on the southern side of Chimatao promontory. A sandbank, which dries, extends fully half a mile from the southern side of the promontory, and at the eastern end extends, as a narrow spit, for about 2 miles in a south-easterly direction. Another spit, which partly dries, extends in a north-westerly direction from a position on the shore of the bay about 5¼ cables south-eastward of the north-western extremity of the promontory, leaving a narrow passage, with a least depth of 6 feet (1^{m}8), between the extremities of these two spits.

There is sheltered anchorage, for vessels with local knowledge, in depths of from 6 to 10 feet (1^{m}8 to 3^{m}0) between the two spits; this anchorage forms the Treaty port of Lungkow, which is the seaport of Hwanghsien (Wang hsien), situated about 14 miles eastward. The usual draught limit for vessels entering the inner harbour is about 14 feet (4^{m}3), but in 1937 it was reported that it was inadvisable for vessels drawing more than 9 feet (2^{m}7) to enter.

Leading lights are exhibited at the head of the bay and immediately southward of the town of Lungkow. The front light is exhibited, at an elevation of 50 feet (15^{m}2), from a mast, painted black and white in horizontal bands, with a triangular daymark, situated on the beach; the rear light is exhibited, at an elevation of 60 feet (18^{m}3), from a similar mast, with an inverted triangular daymark, situated 2 cables eastward of the front light. These lights in line, bearing 084°, lead through the narrow passage between the two sand spits.

Another pair of leading lights indicate the turning point into the inner harbour after passing through the entrance. The front light is exhibited from a mast, painted black and white in horizontal bands, situated on the beach about 6 cables northward of Lungkow; the rear light is exhibited from a similar mast about 1½ cables north-north-eastward of the front light. These lights are in line bearing 023°.

The northern side of the narrow passage between the two sand spits is marked by three black spar buoys; the two outer buoys are surmounted by balls.

A disused concrete pier extends from the shore in a south-westerly direction from a position about 1½ miles north-westward of Lungkow; there are some warehouses near the root of the pier. There is a wharf, 188 feet (57^{m}4) in length, close southward of the custom house. There are two chimneys close northward of Lungkow; the northern and higher of these is 150 feet (45^{m}7) high, and the other one is 50 feet (15^{m}2) high. There are two small hospitals. Eggs and vegetable are obtainable; the water supply is good, but there are no means or transporting it to vessels. A small stock of coal is maintained.

Chart 1262.

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Chart 1255.

In 1935, 1,042 steam vessels with an aggregate of 492,480 tons entered the port. The deepest draught vessels to enter the outer and inner harbour had draughts of 19 feet (5m8) and 15½ feet (4m7), respectively.

Coast.—Dangers.—Shih hu swei is a slight indentation in the coast on the western side of a point, from which a reef extends about 2 cables northward, about 14½ miles south-south-westward of the lighthouse on Chimatao promontory; it is used by junks with offshore winds. A rock, with a depth of 2 fathoms (3m7) over it, lies about 3 miles north-eastward of this point; a pinnacle rock, with a depth of 2 fathoms (3m7) over it, lies about 1½ miles north-westward of the same point, and a rocky reef, with a depth of 3 fathoms (5m5), lies about 1½ miles farther north-westward. Nearly 4 miles west-south-westward of this point is a point, with a rock lying close off it, rising to a sandhill which has a shrine on it. About 3½ miles farther west-south-westward is Sansan Saddle, a hill with a double summit, which rises above a point, but a sharp-topped shoulder on the eastern side gives it the appearance of having three peaks; the north-western side of this hill terminates in a cliff, which tapers south-westward one mile to a rocky point, where two small streams flow into the sea, and a village of considerable size is situated at the base of the hill.

Hai miau is a remarkable hillock rising abruptly from the plain about 3 miles south-westward of Sansan Saddle (*Lat. 37° 24′ N., Long. 119° 57′ E.*); there is a temple of a reddish colour on its summit.

Laichow bank extends about 8½ miles north-westward from the coast near Hai miau, and is very shoal, with several patches of hard sand which dry; the north-eastern side of this bank is shelving, but in other parts it is fairly steep-to. As this bank has not been closely examined, it should be given a wide berth. The tidal streams set across Liachow bank.

Charts 1255, 1256.

Laichow wan.—Laichow wan is entered between the extremity of Laichow bank and the mouth of the Siaoching ho (Hsiao ch'ing ho), about 36 miles west-south-westward; the eastern part of the bay is named Taiping wan, and about 4 miles inland is a conspicuous hill with a double summit. Fuyung tao, in the northern part of Taiping wan, is a wedge-shaped islet, and about 4 cables westward of it is a small rock just above water; there is a large sand-hill on the coast north-eastward of Fuyung tao, and a sandbank lies 4 cables offshore here.

The western part of Laichow wan is shoal, and there are depths of only one fathom (1m8) up to a distance of about 5 miles offshore. Several rivers flow into the bay, but they can only be approached by small craft at high water; of these the Wei ho, leading to Weihsien, situated about 25 miles inland, is used by junks with a draught of about 4 feet (1m2).

Chart 1256.

Yangkiokow.—Yangkiokow, the port of Tsinan, the capital of Shantung, is situated about 15 miles within the entrance of the Siaoching ho. The depth in this river is rarely more than 6 feet (1m8), hard sand, on the bar at high water, but it is navigable to Yangkiokow; thence a canal, with a depth of 2 feet (0m6) in places, leads to Tsinan, but it is frozen in winter. The entrance to the river is marked by beacons. Steamers ply between this port and Chefoo.

Chart 1262.

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Chart 1256.

Hwang ho.—The Hwang ho or Yellow river rises in Tibet, and has a length of about 2,700 miles; as it has a broad, shallow course liable to change, it is only navigable over comparatively small portions. From the city of Kaifeng, the capital of the province of Honan, to the sea. a distance of about 350 miles, this great river has no permanent bed, but alternately changes its direction through the great plain northward or southward of the Shangtung mountains; it has for ages been kept within vast embankments to prevent the periodic desolation by its inundations.

In the early part of 1854 the river was flowing in a general easterly direction from Kaifeng, and discharged into the sea in about Lat. 34° N., but later in that year it diverted near Kaifeng into a northern bed it had occupied 550 years previously, and joining the Litsing ho, discharged into the Gulf of Pohai about 40 miles north-north-westward of the mouth of the Siaoching ho. In 1934 it was reported that the entrance to the Litsing ho had entirely disappeared, and that the Hwang ho then entered the sea about 27 miles north-north-westward of the mouth of the Siaoching ho.

Chart 598.

Coast.—There is little recent information about the coast between the mouths of the Hwang ho and the Hai ho, some 90 miles north-north-westward; the following remarks are from a description of this locality in the year 1860.

Between the mouths of the Hwang ho and the Takow (Ta san) ho, about 52 miles north-westward, the coast is low and is indented by large openings, with sandbanks extending 3 or 4 miles offshore in places; between the mouths of the Takow ho and the Chi ho, about 25 miles north-westward, the sandy coast is somewhat higher; between the mouths of the Chi ho and the Hai ho, about 25 miles northward, the coast appeared to be an almost unbroken line of sand and mud, within which was a sandy plain.

In coasting along this shore in hazy weather its appearance is very peculiar, all objects being magnified to an extraordinary extent; small villages appear out of the mist like huge towns and men loom like towers, whilst the shores vanish on either hand in long, finely tapering points.

Shoals.—In 1932 a shoal of sand and mud, extending in a north-westerly direction and about 4 cables wide, with a depth of less than 6 feet (1^m8) over it, was reported to lie about 15 miles offshore and about 16½ miles northward of the charted entrance to the Litsing ho (*Lat. 37° 53′ N., Long. 118° 36′ E.*); in 1936 a shoal, with a depth of 6 feet (1^m8) over it, was reported to lie about 19 miles northward of the charted mouth of this river.

In 1933 it was reported that Lanmun-sha, charted about 23½ miles north-westward of the entrance to the Litsing ho, had extended from 12 to 15 miles north-eastward, with a spit, which dries, lying about 15 miles offshore, and a depth of 7 feet (2^m1) about 2 miles north-eastward of the spit.

In 1934 it was reported that the whole of the coast between the mouths of the Litsing ho and the Takow ho had extended from 8 to 14 miles farther seaward than charted; the shoals mentioned above, with the exception of the 6-foot (1^m8) patch about 19 miles northward of the mouth of the Litsing ho, are now, therefore, probably within the low water line.

Chart 1262.

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Chart 598.

HAI HO.—The Hai ho is formed by the confluence of the Pei ho or Peiping river and the Huto ho at Tientsin. It serves to carry away the waters of a vast region, comprising almost all that part of the province of Chihli which lies southward of the mountainous region north-westward of Peiping, and stretches as far as the eastern slopes of the mountains eastward of the province of Shansi and north-eastward of the province of Honan.

The tributaries of the Hai ho have an extremely varied output; during the three months of July, August, and September the rainfall is sometimes very heavy, causing floods, which may extend over large tracts of country, causing enormous damage. The last disastrous floods occurred in 1871, 1890, and 1917, but in other years quite a number of floods have caused great damage, notably that in 1912.

In the autumn the quantity of water flowing out of the rivers diminishes quickly on the whole and becomes less in winter, when the ice lasts about three months; it rises again gradually towards the month of March, when the thaw sets in, and the small fall of the winter's snow melts, and then reaches its minimum in May and early June.

After the summer rains, the water courses from the mountainous regions have all a decided torrential character, and they carry with them an abundant quantity of matter in suspension; in many cases the moving mass is more a mud than a liquid, and contains as much as 25 per cent. of solid matter. On leaving the mountainous regions the various water courses have raised their beds, by successive additions of alluvial soil, to a height considerably above that of the neighbouring lands.

In a certain number of cases, especially in the Pei ho and Yung ting ho, the rivers are dammed up as fas as their lower course, but in big floods the dykes are regularly broken through at certain places; thus a breach of the dyke of the upper Pei ho, at some 20 miles above Tungchow, the port of Peiping, situated 90 miles up the Pei ho above Tientsin (*Lat. 39° 09′ N., Long. 117° 11′ E.*), diverted much of the flow of water into the Chien kan ho, a tributary of the Chi Yün ho, which flows into the sea at Pehtang (page 371), thus depriving the Hai ho of a large part of the supply of fresh water from this river which it formerly received.

Of the tributaries of the Hai ho the water of the Yung ting ho is the most heavily laden with silt and consequently is the river that mostly affects the depths in the Hai ho. During the summer freshets of 1929 the dykes of the Yung ting ho burst and the surrounding country was flooded. The strength of the stream was greatly reduced, much silt in the water was deposited, the river flowed on with comparatively little matter in suspension and an immediate improvement was noticed in the depths of the Hai ho.

Charts 2653, 2654.

In 1897 the Hai ho Conservancy Commission was appointed, and various measures have been adopted for improving the navigable conditions of the river. The course of the Hai ho has already been improved by various cuttings which eliminated many bends, thereby reducing the length of the river and making the conditions for the propagation of the tide more favourable.

The depths in the Taku bar channel have, with the improvement of

Charts 1256, 1262.

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Charts 2653, 2654.

the river itself, and in later years by dredging, been increased, but in years of heavy floods heavy silting has taken place; this can only be met by making improvements in the system of the tributaries of the Hai ho with the object of:—

(*a*) Securing a direct outlet to the sea of that portion of the output of the tributaries during heavy floods that the Hai ho is not capable of accommodating.

(*b*) To reduce as far as possible the menace of silting, which is principally caused by the Yung ting ho.

(*c*) To assure to the Hai ho as large an output as possible during times of flood subsidence, and the whole output of the tributaries during the dry season.

The execution of works towards the attainment of these objects has been entrusted to the Commission for the Improvement of the River System of Chihli, appointed after the floods of 1917.

Formerly the river was closed to navigation on account of ice from December to February, and sometimes longer, but the improvements already carried out have had excellent results from the point of view of keeping the river open to navigation in winter. With the ice-breakers now in use there is usually no difficulty in keeping the river open as far as Tientsin during the months of December and February, and, in a normal winter, this is possible also in January.

Depths.—The sea level is considerably affected by the direction and force of the wind, easterly winds raising it and northerly winds lowering it. The Hai ho Conservancy Commission endeavour to maintain such a depth in the river that vessels of 13 feet (4^{m}0) draught can reach Tientsin at average high water, which is 8 feet (2^{m}4) above Taku datum.

Throughout 1936, except for short periods between January and March, vessels up to a length of 315 feet (96^{m}0) and a draught of 13 feet (4^{m}0) were able to proceed up the river to Tientsin and swing there; the number of steam vessels arriving at the bund with a draught of 13 feet (4^{m}0) or more was 194 as compared with 145 during the previous year.

In November, 1936, the minimum depths at average high water were as follows:—

On the centre line of the Bar channel ..	16.8 feet (5^{m}1)
Deep hole to Taku reach	19.9 feet (6^{m}1)
Taku reach to Tangku reach	23.3 feet (7^{m}1)
Tangku reach to Powder reach ..	21.5 feet (6^{m}5)
Powder reach to Sinho reach ..	18.2 feet (5^{m}5)
Sinho reach to Salt reach	18.4 feet (5^{m}6)
Salt reach to Ko ku reach	15.3 feet (4^{m}7)
Ko ku reach to Stone reach ..	15.0 feet (4^{m}6)
Stone reach to Fourth cutting ..	15.8 feet (4^{m}8)
Fourth cutting to Third cutting ..	13.8 feet (4^{m}2)
Third cutting to Tombs Bend cutting ..	13.6 feet (4^{m}1)
Tombs Bend cutting to Tientsin	13.9 feet (4^{m}2)

In the early part of 1937 the draught of vessels navigating in this last reach, above the Custom house, was temporarily limited to 11 feet (3^{m}4) at prevailing high water level at Tientsin.

Navigation.—Vessels proceeding to Tientsin (*Lat. 39° 09′ N., Long. 117° 11′ E.*) should arrive at the Taku light-vessel, where the pilot

Charts 598, 1256, 1262.

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Charts 2653, 2654.

will embark, not less than 3 hours before high water on the Taku bar; this will ensure rising water and a flood stream all the way to, and when swinging at, Tientsin, except in the freshet season, during July and August, when there is no flood stream at Tientsin. The passage from Taku light-vessel to securing at Tientsin should, under these circumstances, take about 5 hours. Vessels proceeding up the river are required, by the pilots, to have a stern anchor ready for letting go after passing the Entrance light-buoy.

Vessels proceeding down river should leave Tientsin about 2 hours before high water there; this ensures the best water around the bad bends. It is advisable to arrange the time of departure with the pilot the day before, and if necessary make a final adjustment on the day of departure, as the tides are irregular.

It is considered desirable, if circumstances permit, to swing on arrival. If, owing to the traffic in the river, a vessel arrives at Tientsin at slack water or at the beginning of the ebb, it may still be possible to swing with the engines alone, provided that the wind is favourable.

As the bed of the river alters frequently, it is advisable to obtain the latest information from the Conservancy Board before making the passage. The harbour master at Tientsin promulgates information from time to time giving the permissable draught of vessels proceeding to Tientsin.

Pilots do not undertake the passage up or down the river at night, except under the best conditions of moonlight. Passage over the Bar and anchorage under the Bar signal station is, however, undertaken under normal conditions at night.

For navigation rules, *see* pages 367—370.

Chart 2653.

Taku bar and roadstead.—Taku bar extends about 2½ miles seaward from the mud banks extending about 3 miles from the coast on either side of the entrance to the Hai ho; these mud banks dry and are of a treacherous character, being unfit for landing on when uncovered.

Taku road lies seaward of the bar, and vessels awaiting the tide anchor here according to their draught, taking care to leave the fairway between Taku light-vessel and the entrance to the Bar channel clear; there is a depth of 24 feet (7^{m}3), good holding ground, about 9 miles east-south-eastward of the river entrance.

The land at the entrance to the river is low and flat; in clear weather the white cavaliers of the dismantled forts may be seen. There are several beacons, erected for surveying purposes, on the foreshore northward and southward of the entrance; the positions of these can best be seen on the chart. Diamond beacon, a black mast with a daymark, is situated on the drying mud bank on the northern side of the bar channel, and is also for surveying purposes. The light-vessel is the only good mark for Taku road.

The climate in the road during summer is agreeable and healthy, the sea breezes which then prevail tempering the heat; vessels at anchor are liable to be infected with flying insects with offshore winds. Heavy gales cause an unpleasant sea. In winter, when the weather is very severe, vessels cannot anchor in the road owing to ice.

Light-vessels.—Buoys.—Beacon.—Taku light-vessel is moored about 8¼ miles east-south-eastward of the tide signal station on the

Charts 598, 1256, 1262.

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Chart 2653.

northern side of the entrance to the Hai ho and on the line of the bar leading lights; the vessel is painted red, with "Taku" in white on her sides, and has a light-tower from which a light is exhibited at an elevation of 35 feet (10m7). A fog signal is sounded from the light-vessel. A black spar buoy is moored about one cable southward of the light-vessel and is used as a watch-buoy for that vessel. From about 1st December to 1st March the light-vessel is removed on account of ice, and her place is then taken by an ice-breaker, which acts as a light-vessel so long as ice-breaking operations permit; when such operations are needed she will, when possible, act as a light-vessel for a few hours before the expected arrival of a vessel. When acting as a light-vessel the ice-breaker will exhibit a black ball at the masthead, and at night will flash her searchlight for *five minutes every fifteen minutes*.

Entrance light-buoy, marking the approach to the channel over the bar, is moored about 6¾ miles east-south-eastward of the tide signal station and on the line of the leading lights; this light-buoy exhibits a *white flashing* light *every three seconds*. From about 1st December to 1st March this light-buoy is replaced by a black spar buoy.

Bar light-vessel is moored on the bar about 4 miles south-eastward of the tide signal station and on the line of the bar leading lights; the vessel has one mast, is painted red, with "Bar light-boat" in white on her sides, and exhibits a light at an elevation of 25 feet (7m6). A fog signal is sounded from the light-vessel. This light-vessel is removed from about 1st December to 1st March, on account of ice, and her position is marked by a black spar buoy.

A red conical buoy and a black conical buoy are moored about midway between the Entrance light-buoy and the Bar light-vessel; these buoys are about half a cable apart, and are moored on the north and south sides, respectively, of the line of the bar leading lights. Two red conical buoys are moored about 3 miles and 2¾ miles, respectively, south-eastward of the tide signal station and on the northern side of the bar leading line. These four buoys are intended to facilitate navigation during thick weather, when the bar leading lights are obscured.

A beacon, consisting of a black and white mast, 50 feet (15m2) in height, surmounted by a sphere, stands nearly 2 miles south-south-eastward of the tide signal station, and marks a heap of stones on the edge of the mud bank on the southern side of the bar channel.

A light-buoy, painted black, known as Deep hole buoy, exhibiting a *red flashing* light *every three seconds, flash 0.3 sec.*, is moored close north-eastward of the above beacon and marks the southern side of the fairway through Deep hole.

Spit buoy, nearly 4 cables north-westward of the beacon on the southern side of Deep hole, is a red can buoy; from about 1st December to 1st March this buoy is replaced by a black spar buoy.

Leading marks for the Bar channel.—Lights.—Taku bar leading marks, consisting of two black iron framework beacons with spherical daymarks, are situated southward of the entrance to the Hai ho. The front beacon (*Lat. 38° 58′ N., Long. 117° 43′ E.*) is situated nearly 1½ miles southward of the tide signal station, and exhibits a light at an elevation of 46 feet (14m0); the rear beacon is situated about 8 cables westward of the front beacon, and exhibits a

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Chart 2653.

light at an elevation of 80 feet (24m4). These two beacons in line, bearing 283°, lead from Taku bar light-vessel to Deep hole, passing close northward of the Entrance buoy and the Bar light-vessel.

South Dike light is exhibited, at an elevation of 15 feet (4m6), from a post on the eastern end of a dike which extends from the coast near the front Taku bar leading beacon; this light is in line with Taku bar leading lights.

Leading marks for the approach to the entrance of the Hai ho are situated on the western side of the entrance to the river, and consist of two black pyramidal beacons. The front beacon is situated about 3½ cables south-westward of the tide signal station, and exhibits a light at an elevation of 37 feet (11m3); the rear beacon is situated about 2¾ cables north-north-westward of the front beacon, and exhibits a light at an elevation of 53 feet (16m2). These lights in line, bearing 331°, lead from Deep hole to the entrance of the river.

A light is exhibited, at an elevation of 50 feet (15m2), from a black mast with a triangular daymark, situated at Peitang, on the eastern side of the river entrance and about half a mile north-westward of the tide signal station. This mast, or the light at night, in line with the tide signal station, bearing about 317°, indicates the position where vessels alter course on entering the Deep hole.

Tidal streams.—The tidal streams in the Bar channel set in the direction of the channel when the mud flats in the approach to the river entrance are uncovered, but as soon as the flats are covered they set across the channel in a direction approximately parallel to the coast, the flood stream setting northward and the ebb stream southward; the maximum rate is about 2 knots at spring tides and one knot at neap tides.

Depth signals.—Signals indicating the depth in the Bar channel, as shown in the diagram facing this page, are displayed at the Tide signal station, situated on the eastern side of the entrance to the Hai ho, and also from the Bar light-vessel. The signals are depicted as they will be seen by an incoming vessel, and are made by means of black balls and shapes by day; the 6-ins. signal, when it occurs, is displayed nearest the outer end of the left hand part of the yard and below the foot signal. At night *white* lights take the place of the balls and *red* lights those of the shapes and also the 6-ins. signal; the latter is then displayed, when it occurs, near the inner end of the left hand part of the yard below the foot signal. The Bar light-vessel only exhibits the day signals.

A black triangle at the masthead of the signal station flagstaff, or a *green* light above a *white* light, indicates a rising tide; an inverted triangle at the masthead, or a *white* light above a *green* light, indicates a falling tide.

At Tientsin a rising tide is indicated by a black cone, point upwards, by day, and at night by a *green* light over a *white* light; these signals are shown at the riverside yardarm of the Customs' flagstaff on the British bund.

Taku and Tangku.—Taku (*Lat. 38° 58′ N., Long. 117° 40′ E.*) is situated on the right bank of the Hai ho, just within the entrance, and Tangku is situated on the opposite bank, about 2 miles within the entrance; they are the ports of Tientsin, and are used by vessels which are unable to reach that city. They are both controlled by the

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To face page 364.

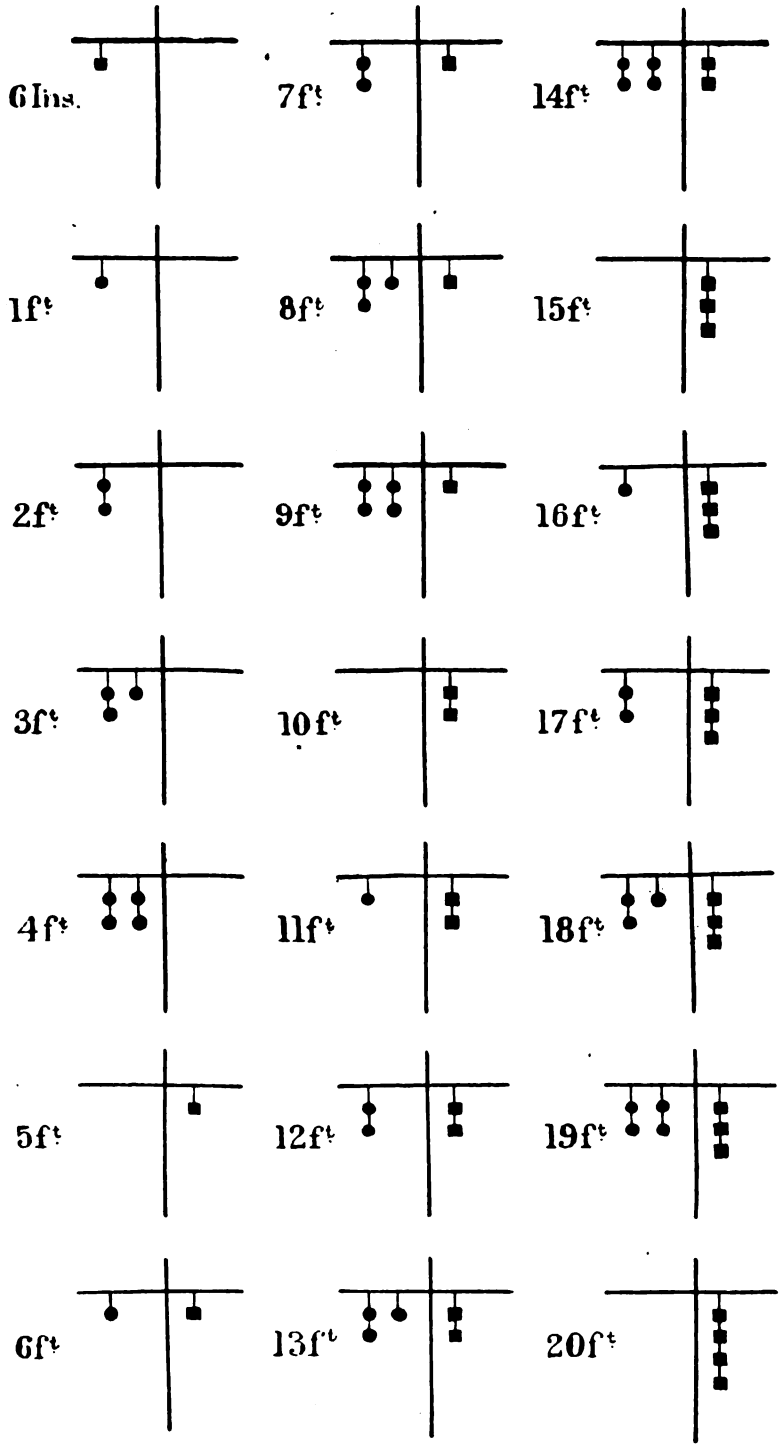

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Chart 2653.

Chinese Maritime Customs and are directly under the Harbour master, Tientsin. Taku and Tangku are comparatively small villages; the railway station at Tangku is the terminus of the Peiping-Mukden railway.

Tidal streams.—The time of high water at Tangku is about 1½ hours later than that at Taku bar, and the tidal streams turn in mid-river from one to 1½ hours after high and low water. From observations made from 10th to 17th October, 1935, it was found that the in-going stream made about 3½ hours before high water at Taku, and the out-going stream about 1½ hours after high water at that place; slack water lasted for about 15 minutes. The maximum rate of the in-going stream was 3 knots, and the maximum rate of the out-going stream was 4 knots.

Harbour facilities.—There are numerous wharves at Taku and Tangku, some having a berthage length of over 1,000 feet (304^{m}8).

Repairs can be executed at Taku and Tangku, and there is also a Chinese Naval dockyard at Tangku. There is a concrete dock belonging to the Hai ho Conservancy Commission (*see* Appendix I.); there are several other docks and wet basins, but these are merely excavations in the bank, with mud dams as lock gates.

The Kailan Mining Administration has a wharf, with a berthage length of about 1,300 feet (396^{m}2), at Tangku; about 25,000 tons of coal are usually kept in stock.

There is a W/T station at Taku, *see* page 42. Taku and Tangku are connected to the general telegraph system.

Storm signals of the China Seas Signal Code are displayed from the flagstaff of the Maritime Customs at Tangku; *see* page 27.

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Harbour regulations for the Port of Tientsin.—The following are extracts from the Harbour regulations for the Port of Tientsin:—

1.—The term "vessel" in these regulations refers to vessels of foreign type.

2.—The control of the Harbour Authorities of the port of Tientsin extends from the ex-Austrian bridge to 3 miles eastward of the 2-fathom (3^{m}7) contour of Taku bar.

3.—The anchorages for foreign-type vessels are:—

(*a*) For vessels other than those provided for in (*b*) and (*c*):—

At Tientsin: from the ex-Austrian bridge to the lower end of the ex-Belgian concession.

At Tangku: from the upper end of the China Merchants Steam Navigation Company's wharf to the North fort.

Outside the bar: from the 2-fathom (3^{m}7) contour to 3 miles eastward of it.

Note.—When the draught of vessels is too deep to proceed through the channel across the bar, or when they have only passengers to land, or a small amount of cargo to handle, they may obtain special permission to remain outside Taku bar on application in writing to the Commissioner of Customs through their agents.

(*b*) For explosives: in Powder reach, Tangku, or outside Taku bar and clear of other shipping.

(*c*) For Quarantine purposes: outside the Bar.

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Charts 2653, 2654.

5.—Swinging berths shall be kept clear of craft in order to be always available for use. Should any of the swinging berths be closed, the following signals will be displayed from a mast situated on the roof of the Hai ho Conservancy Commission's office :—

Upper swinging berth closed : a black ball by day, and two *white* lights, disposed vertically, at night.

Middle swinging berth closed : a red ball by day, and a *red* light at night.

Lower swinging berth closed : a green ball by day, and a *green* light at night.

6.—Vessels shall moor in accordance with instructions from the Harbour master, and shall not shift their berths without a special permit, except when outward bound.

7.—Application for berths or for permission to shift berth must be made at the Harbour master's office at Tientsin or at Tangku (*Lat. 39° 01′ N., Long. 117° 40′ E.*), according to the anchorage in which the vessel concerned is berthed, and the necessary instructions will be given. If a vessel be instructed by the Harbour master to shift her berth, she shall do so.

11.—Within the Harbour limits of Tientsin a vessel must not leave her berth or attempt to swing round while another vessel is passing through or entering the anchorage.

12.—Vessels are forbidden to go at such speed in the river as renders their wash dangerous to steam vessels lying alongside the bund or wharves, or to properly laden cargo-boats and sampans. When properly authorised slow boards are erected (or a signal from the International Code of Signals to the same effect is displayed) vessels must proceed at such speed only as is necessary to keep them under command.

14.—Every craft, of whatever description, conveying explosives or dangerous or inflammable goods through any part of the port shall display a red flag by day and exhibit a *red* light at night where it can best be seen, and at a height of not less than 12 feet ($3^{m}7$) above the highest part of the deck or superstructure.

15.—Vessels arriving from an infected port, or having on board a person suspected of having an infectious disease, or on board of which a death has occurred during the voyage from the last port, or if conveying a corpse not accompanied by a medical certificate showing that death was due to a non-infectious disease, shall, on approaching the quarantine anchorage, display flag Q of the International Code of Signals and shall anchor in the quarantine anchorage until the vessel has been inspected by the Port Health Officer, and shall not proceed until pratique has been granted.

19.—Ballast, ashes, refuse, etc., must not be thrown into the river or its approaches. Vessels wishing to discharge ashes of other refuse should display flag Y of the International Code of Signals at the fore truck, when a licensed ash-boat will be sent.

20.—No oil of any description shall be discharged into the Hai ho or its approaches. No vessel shall wash out double bottoms, tanks, etc., which contain oil, in the river or its approaches.

22.—Vessels when passing dredging plant at work in the river are to proceed as slow as is consistant with safety. By "dredging plant" is meant all dredgers, pumping stations, barges, tugs, long shoot pipes, floating pipe-lines, etc.

Charts 598, 1256, 1262.

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Charts 2653, 2654.

23.—The following signals will be exhibited by dredgers operating in the Hai ho or on the Taku bar :—

By day : a black ball will be displayed on that side of the dredger which is clear for vessels to pass.

At night : a *white* light will be exhibited on that side of the dredger which is clear for vessels to pass, and a *red* light will be shown on the side of the dredger where there is no clear passage. When moored, dredgers will exhibit the ordinary lights prescribed for a vessel at anchor.

24.—A vessel following a conducting ice-breaker is expected to obey the signals made by the ice-breaker.

25.—The sounding of steam whistles or sirens or the use of other sound signals, except for the purpose of signalling in accordance with the Regulations for Preventing Collisions at Sea, or for the purpose of warning vessels of danger, is strictly forbidden.

26.—All arc lights on board vessels shall be so shaded or screened riverwards as to avoid embarrassment to navigators. Searchlights shall not be used in such manner as to interfere with navigation.

27.—All vessels shall keep on board a sufficient number of hands to clear and pay out chain and to slacken off mooring lines when steam vessels are passing.

28.—Vessels of all descriptions lying at their moorings must have their anchors buoyed. Should the anchor, chain, or wire in any way obstruct the fairway, it must be shifted or slackened to allow vessels to pass in safety.

33.—In case of fire occurring on board a vessel in port the fire bell must be rung immediately by that vessel and by those above and below her, and the signal N H of the International Code displayed by the vessel on which the fire has occurred, if possible, and by those above and below her, during the day, or a light lowered and hoisted continuously at night. Notice should be given to the Harbour office immediately.

Navigation rules.—The provisions of the Regulations for Preventing Collisions at Sea are operative in the Hai ho and its approaches, except is so far as they are modified by the Special Navigation Rules given below.

The following rules are operative on the Bar channel for a distance of 2½ cables on either side of the centre line of the channel from 1½ miles seaward of the Entrance buoy (*Lat. 38° 56′ N., Long 117° 51′ E.*) to the Deep hole :—

1.—All vessels, awaiting the rise of the tide, must anchor as follows :—

Incoming-vessels : well clear of the channel entrance.

Outgoing vessels : between a line drawn south-west from the North Fort, situated on the eastern side of the entrance to the Hai ho, and a line drawn east from the Taku Tug and Lighter Company's premises, situated on the western side of the entrance ; or in the Deep hole.

Masters and pilots are to take every precaution, when anchoring in the Deep hole, not to obstruct the view of the Taku bar leading marks, and they should not anchor in a position which will interfere with navigation or dredging operations.

2.—Vessels must not attempt to pass through the channel

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Charts 2653, 2654.

until the tide signals show a depth corresponding to or greater than the actual draught of such vessels.

3.—On approaching the channel, steam vessels and tug must give one long blast on the whistle. Should any of th tugs or dredgers engaged in the channel work reply by a succession of short blasts from their whistles, or exhibit a red flag, the channel is not on any account to be entered. Vessels which have been so warned will be informed by signals as soon as the channel is navigable.

4.—Should a vessel ground in the channel, the master or pilot must report in writing to the Harbour master without delay, specifying bearings of known objects, time of grounding, draught of vessel, depth of water signalled at the time of grounding, etc.

5.—Tugs towing lighters and other vessels of light draught should endeavour to keep on the northern or southern sides of the Bar channel, leaving the centre line for vessels of deeper draught.

6.—Steam vessels and tugs, while in the channel, must maintain a distance of not less than 2½ cables when following one another, must keep well clear of the dredging plant in the channel and must conform with any signals from such vessels.

7.—In fog, mist, snow, or heavy rainstorms, vessels proceeding across the bar should immediately reduce their speed, stop or anchor, due regard being given to the danger of navigating a restricted channel with poor visibility.

8.—Vessels when in danger of sinking must not use the main channel, but are to be navigated towards the river mouth on the lee-side bank of the channel.

The following rules are operative from the Deep hole to Tientsin :—

1.—When two vessels are meeting, other than as provided for in Article 2, each shall, when it is safe and practicable, keep to that side of the channel which lies on the starboard side of such vessel.

Note.—In the case of a light-draught and a deep-draught vessel meeting, mutual safety may in some circumstances be best secured by each vessel keeping to her port side of the channel.

2.—A vessel proceeding against the current, when meeting a vessel proceeding with the current, shall provide for the passing of the other vessel in a locality where such passing is safe, slowing down and acting in accordance with Article 1, or stopping and tying up to, or stopping and lying up against either bank, as may be necessary to that end. When it is safe for the other vessel to pass, she shall sound three long blasts.

Note.—The term "tying up" means that the vessel is made fast to the shore. The term "stopping and lying up against the bank" means that the vessel is as close to the bank as possible and that she is not materially moving over the ground.

3.—A vessel proceeding with the current, when meeting a vessel proceeding against the current, shall proceed at the

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lowest speed consistent with her being kept under command, and particularly shall endeavour to keep back until the other vessel indicates that it is safe to pass by giving three long blasts.

4.—When two vessels are meeting, the sound signal as provided for in Article 7, indicating the side of the channel they intend to follow, is invariably to be made. A vessel stopping and lying up against the bank shall also make this signal.

5.—As regards a vessel overtaking another vessel:—

(*a*) The overtaking vessel shall sound one long blast, meaning "May I pass?"

(*b*) The vessel overtaken shall, when it is safe for the other vessel to pass and when it is desired to acquiesce in such passing, signify that acquiescence by sounding three long blasts and shall indicate which side of the channel she intends to follow by means of the sound signal as provided for in Article 7 (*a*) or 7 (*b*).

(*c*) The vessel being overtaken, having given the acquiescent signal, shall slow down to the lowest speed consistent with her being kept under command, and the overtaking vessel shall proceed at no greater speed than is needed to effect the passing with safety.

6.—A vessel proceeding with the current shall, by day, display at the fore-truck one black ball, and at night shall exhibit a *green* light not less than 6 feet (1^{m}8) above the mast-head light.

7.—The following sound signals are to be used when the meaning attached to them is required to be conveyed:—

(*a*) One short blast, "I am keeping to that side of the channel which lies on my starboard hand."

(*b*) Two short blasts, "I am keeping to that side of the channel which lies on my port hand."

(*c*) Three short blasts, "My engines are going full speed astern."

(*d*) Five or more short blasts, "Keep back, danger, you cannot pass."

(*e*) One long blast by a vessel having the right of way, "I am proceeding," and made by an overtaking vessel, "May I pass?"

(*f*) Three long blasts, "Come on, you can pass."

Chart 2654.

The following are extracts from the rules operative for vessels proceeding to, or leaving, berths in the upper limits of Tientsin harbour above the International bridge (*Lat. 39° 08′ N., Long. 117° 12′ E.*):—

1.—All vessels proceeding above the International bridge shall be fitted with a stern anchor, lifted by adequate machinery, of sufficient size and weight to enable the vessel to be brought up sharply, and such stern anchor shall be ready for immediate use.

2.—Vessels must in all cases pass through the International bridge against the current; masters and agents should, therefore, arrange the time of arrival or departure accordingly.

3.—All vessels intending to proceed above the International bridge

Charts 598, 1256, 1262.

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Chart 2654.

shall display, where best seen, flag Z of the International Code of Signals by day, and show a *red* light over a *green* light at night, and sound a prolonged blast on the whistle when passing the Native Customs station in Everlasting reach. Such flag or lights are to be shown until the vessel arrives at her destined berth.

4.—Should a departing vessel be under way and proceeding to pass through the bridge, the following signal will be exhibited on the signal mast at the lower end of the ex-German bund :—

By day : a black and white semaphore arm in a horizontal position.
At night : a *red* light.

Incoming vessels observing such signal should proceed with caution, or moor temporarily at the berth alongside the signal mast, until the semaphore arm is lowered, or a *green* light is exhibited at night, indicating " The bridge is open, you may proceed."

5.—No two vessels proceeding in opposite directions shall pass through the bridge at the same time.

6.—Vessels shall not overtake or attempt to overtake any other vessels in the section of the river lying between the International bridge and the French Consulate.

7.—If for any reason the bridge cannot be opened, the following signals will be exhibited simultaneously from the signal mast at the ex-German bund, the Rue de Takou, and the bridge :

By day : a red semaphore arm in a horizontal position.
At night : three *red* lights disposed vertically.

Chart 2653.

Pilots.—The pilot station is at Taku, on the right bank and a short distance within the entrance. The pilot embarks between the Taku light-vessel and the Entrance buoy. There is seldom any difficulty in obtaining a pilot, but it is advisable to give notice in advance.

Ice-breaker service.—During the ice season messages are broadcast by wireless daily at 1030 and 1730 by an ice-breaker, giving the ice conditions at Taku, and any special information of an urgent nature concerning the weather and the condition of the fairways.

Vessels desiring the services of a pilot during the ice season should telegraph to " Pilots, Taku," stating the probable time of their arrival off Taku ; arrangements will then be made to have a pilot on board an ice-breaker to await the vessel's arrival off the bar.

An ice-breaker will, if necessary, lead the way in and will signal any instructions that may be necessary. Vessels must keep at such a distance away from the ice-breaker as will eliminate all danger to the ice-breaker in the event of that vessel being suddenly brought to a stop. The following signals will be used by the ice-breaker :—

Signal.	*Signification.*
One short blast . .	I am altering my course to starboard.
Two short blasts. .	I am altering my course to port.
Three short blasts .	My engines are going astern.
One long blast . .	(*a*) *from the following steamer*—Can I pass ahead of you ? (*b*) *from the ice-breaker*—You are requested to pass ahead of me.
Three long blasts .	Come on.
Five short blasts. .	Keep back.

Charts 598, 1256, 1262.

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Chart 2653.

A vessel requiring the assistance of an ice-breaker should make the following signals :—

By day : A pendant with two balls beneath it ; also a succession of one long and three short blasts on the whistle or siren.

By night : Three lights, *white*, *red*, *white*, disposed vertically and not less than 6 feet (1^{m}8) apart ; also a sucession of one long and three short blasts on the whistle or siren.

Chart 2654.

Tientsin.—Tientsin (*Lat. 39° 09′ N., Long. 117° 11′ E.*) is the nearest port to Peiping, which is distant about 80 miles. There are British, French, Italian, and Japanese concessions. In 1934 the Chinese population was about 1,500,000 ; in the same year the British concession had a population of 750 British, 3,000 foreigners, and 40,000 Chinese. British Consular officers reside here.

Harbour facilities.—There are 38 berths alongside the bunds at Tientsin, capable of accommodating vessels up to about 300 feet (91^{m}4) in length ; practically all vessels are aground at half tide, but the bottom is soft mud.

Fresh provisions are plentiful ; there is a good water supply.

A large supply of coal is kept in stock, and can be loaded at the rate of 40 tons per hour. Fuel oil can be obtained in moderate quantities.

There are several hospitals, including a well equipped military hospital where Naval ratings are received.

Tientsin is connected to the general railway, telegraph and telephone systems. There is regular steamer communication with Shanghai and other Chinese ports, and with ports in Japan. There is a W/T station, *see* page 42.

Shipping.—In 1935, 2,077 vessels with an aggregate tonnage of 2,922,897 tons entered the Port of Tientsin.

Chart 598.

COAST.—The Pehtang ho flows out about 7½ miles northward of the northern entrance point of the Hai ho, the coast between being low and covered with tombs, except the middle part, which is mostly a swamp. The Pehtang ho is approached over a shallow bar, and thence through a narrow channel between mud flats which dry. The village of Pehtang, which is connected to the railway system, is situated on the southern side of the river entrance. From a cursory examination, in 1901, the river for about 5 miles above the entrance was found to have a depth of not less than about 3½ fathoms (6^{m}4) in the middle of the channel, the banks on both sides being fairly steep-to. Open anchorage can be obtained about 10 miles off the entrance to the Pehtang ho, in a depth of about 3½ fathoms (6^{m}4).

The coast between the mouth of the Pehtang ho and the entrance to the Chiang ho, about 16 miles north-eastward, is fronted by a mud bank which dries out for about 1½ miles. The coast between the entrance of the Chiang ho and the mouth of the Ching ho, about 38 miles eastward, has not been examined throughout ; it is fronted by the Sha lui tien banks.

The Ching ho is some 50 miles in length, and is entered by a narrow passage between banks, on which the sea breaks, extending many miles along the coast. In 1913 it was reported that the coast-line in the vicinity of the river, as indicated on the chart, had altered ;

Charts 1256, 1262.

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Chart 598.

it was also reported that the bar, outside the banks, dried right across. No attempt should be made to enter the river without local knowledge.

Islands and dangers.—Light.—Sha lui tien banks, portions of which dry, extend from 7 to 12 miles from the coast between the mouths of the Chiang ho and the Ching ho, and must be approached with great caution. There appears to be no open channel between them and the mainland, but there are passages, used by small junks, between the various banks. The south-western edge is fringed by irregular shoal patches, and sounding gives some warning to a vessel approaching on this side, when within a depth of 8 fathoms (14^m6) ; good anchorage, sheltered from north-easterly gales, can be obtained off this side of the banks. The south-eastern edge of Sha lui tien banks is steep-to.

Tsao-fei-tien island, situated just within the south-east corner of Sha lui tien banks and about 18 miles south-westward of the mouth of the Ching ho, consists of low, weed-covered sand dunes, liable to shift or be washed away. In 1934, fishing stakes were reported to extend about 3 or 4 miles southward of Sha lui tien banks.

A light (*Lat. 38° 56′ N., Long. 118° 31′ E.*) is exhibited, at an elevation of 42 feet (12^m8), from a black iron framework structure, 44 feet (13^m4) in height, on Tsao-fei-tien island.

In 1898 the s.s. *Yung ping* obtained depths of 2 fathoms (3^m7) about 15 miles eastward of Tsao-fei-tien island ; a depth of $1\frac{1}{2}$ fathoms (2^m7) was reported by H.M.S. *Whiting*, in 1901, to lie about $10\frac{1}{2}$ miles east-north-eastward of the island.

Directions.—With a strong south-easterly wind caution is necessary to avoid being driven too near the Sha lui tien banks. Vessels proceeding to Taku road should pass not less than 3 miles southward of Tsao-fei-tien island light ; soundings of not less than 9 fathoms (16^m5) should then be maintained over a distance of about 20 miles westward, and any sudden decrease of depth shows that the vessel has been set northward by the indraught through the various channels among the banks.

Along the southern side of the Sha lui tien banks the tidal streams set west-north-westward during the rising tide, and south-eastward during the falling tide, with maximum rates of $4\frac{1}{2}$ and 3 knots, respectively, at spring tides. On the western side of the banks the tidal stream sets northward with the rising tide and the rate is less.

Chart 1256.

GULF OF LIAOTUNG.—The Gulf of Liaotung, forming the northern part of the Gulf of Pohai, is entered between the land in the vicinity of the mouth of the Ching ho and the southern extremity of Kwantung peninsula, about 110 miles eastward. The Liao ho, on which is the treaty port of Newchang, flows into the head of the gulf.

Ice.—*See* page 23.

Chart 598.

WESTERN SIDE OF THE GULF.—Coast.—About 13 miles north-eastward of the mouth of the Ching ho is Hsinshai kow, a creek in an extensive swamp which is more or less covered at high water ; farther south-westward large plains of sand and mud extend from 6 to 8 miles inland and present a desolate appearance. The mirage on this

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Chart 698.

part of the coast is very deceptive, the dry sand having the appearance of water, whilst objects are considerably distorted, small huts appearing on first sight to be large forts.

The Lwan (Lau-mu) ho flows out about 16 miles north-eastward of the mouth of the Ching ho. In 1935 it was reported that its entrance was almost entirely blocked by a mud bank. An islet, covered with grass, lies on the south-western side of the entrance and on the outer end of a sandbank, which dries.

The coast between the mouth of the Lwan ho and Shali (Shati) point, situated about 10 miles north-north-eastward, is partly fronted at a distance of about one mile by a narrow sandbank, which nearly dries; this part of the coast consists of extensive mud flats which are occasionally covered. Shali point (*Lat. 35° 29′ N., Long. 119° 14′ E.*) is the southern extremity of a ridge of sandhills, about 30 feet (9^{m}1) high, which extend along the coast for about 22 miles northward; this point must be given a berth of at least 3½ miles. The Pu ho flows out about 17 miles northward of Shali point and drains a somewhat swampy flat; it enters the sea through a gap in the sandhills, and the bar off the mouth dries.

The Yang ho flows out about 6 miles northward of the mouth of the Pu ho and about one mile north-eastward of the northern end of the sandhills; the entrance over the bar is very shoal. The Taicho ho flows out about 2 miles north-eastward of the Yang ho, and the bar is very shallow.

Chart 3378.

Pehtaiho anchorage.—Light.—Rocky point is situated about 4 miles eastward of the mouth of the Taicho ho and has a conspicuous light-tower on its summit, from which a light, privately maintained, is occasionally exhibited; shoal water extends about 2 cables from the point.

Legation point, on which are the Legation bungalows and a flagstaff, is situated nearly one mile westward of the light-tower on Rocky point. Liuchwang village is situated about half a mile westward of Legation point; the land in the vicinity is cultivated to the foot of the mountains about 4 or 5 miles inland.

In 1934 H.M.S. *Cumberland* anchored about 1¼ miles southward of Legation point, in a depth of 5 fathoms (9^{m}1), sand and mud, with the old light-tower on Rocky point bearing 039°, and a conspicuous white cupola nearly 1¼ miles westward of Legation point bearing 314°; soundings taken at the time showed that there were depths of from 4 to 5½ fathoms (7^{m}3 to 10^{m}1) around this position. The white cupola is hidden by hills when within a distance of about three-quarters of a mile offshore. In the same year H.M.S. *Sandwich* anchored closer inshore, in a depth of 3 fathoms (5^{m}5), with the flagstaff on Legation point bearing 018°, and the old light-tower on Rocky point bearing 076°. In 1935 H.M.S. *Falmouth* anchored with the flagstaff on Legation point bearing 337°, distant half a mile, in a depth of 3 fathoms (5^{m}5), blue clay, very good holding ground. Landing can be effected in a sandy cove on the western side of Legation point.

Caution must be exercised when approaching Pehtaiho anchorage, as this locality has not been accurately surveyed.

Charts 2357, 3378.

Shallow bay.—Shallow bay, between Rocky point and Creek point

Charts 1256, 1262.

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Charts 2357, 3378.

(*Lat. 39° 54′ N., Long. 119° 37′ E.*), about 7 miles north-north-eastward, is free from dangers and the shore is sufficiently steep to allow boats to land easily. The Tang ho, which flows into the northern part of the bay about 2 miles westward of Creek point, is a mountain torrent and is not navigable ; there is a quicksand at its entrance.

Shallow bay affords good anchorage in depths according to draught ; the bottom is thick black mud, good holding ground. In 1928 H.M.S. *Magnolia* anchored in the southern part of the bay, in a depth of about 4 fathoms (7m3), with the old light-tower on Rocky point bearing 215°, and a two-storied villa on a hill about three-quarters of a mile northward of the light-tower bearing 270° ; a good landing place was found on a sand and shingle beach westward of this anchorage.

Chart 2357.

Chinwangtao.—Aspect.—Chinwangtao, situated in the northern part of Shallow bay, is a Treaty port, and is also the coaling port of the Kailan Mining Administration. The coast in the vicinity of Chinwangtao is not easily identified, but Thumb peak (Chart 1256), situated about 15 miles north-north-westward of Creek point and on the western of two mountain ranges rising a few miles inland, is a good mark when approaching from the south-eastward ; *see* view facing page 381. If Thumb peak is obscured, the bluffs at Rocky point (Chart 3378) will be the first objects to be identified.

The Bluff, of which Creek point is the south-eastern extremity, is a low, rocky promontory terminating southward in cliffs from 50 to 60 feet (15m2 to 18m3) high, and fringed by rocks which dry out about one cable ; a short distance within these cliffs the land dips and then rises again to Haze hill, which is conical and sandy, and is situated on the northern part of the promontory. The land for about a mile within the promontory is a flat, sandy plain with occasional sand dunes, but further inland it is well cultivated and thickly populated.

Ice.—Generally speaking, it is only after a calm of a week's duration in winter that ice forms at Chinwangtao, and the most that has been observed there was from 6 to 8 inches thick, extending about a mile offshore. In January and February north-easterly winds may bring down a large amount of drift ice from the head of the Gulf of Liaotung ; if followed by easterly and south-easterly winds the ice may be blown inshore, and under pressure then becomes a considerable hindrance to navigation. In March, 1933, after a considerable period of north-easterly winds, the ice field extended for a distance of 40 miles from Chinwangtao, and H.M.S. *Sandwich* experienced some difficulty in forcing her way through ; from 25 to 40 miles offshore the field contained many large blocks of discoloured ice, dangerous to navigation, and it would have been inadvisable for a vessel to attempt to pass through this at night. In January, 1936, during one of the most severe winters on record, the ice field extended 50 miles offshore, and the approach to and departure from Chinwangtao was difficult for any but high-powered vessels.

Harbour.—The harbour lies between a pier and a curved breakwater which extend from the south-western end of The Bluff, and it affords accommodation for vessels up to 600 feet (182m9) in length, with draughts of from 21 to 26 feet (6m4 to 7m9) ; as the bottom is very soft vessels may ground with safety. As a result of dredging

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Chart 2357.

operations there was a least depth of 27 feet (8m2) in the approach channel in 1936, and vessels with a draught of 25 feet (7m6) could use the harbour at any state of the tide.

There is a berth, 400 feet (121m9) in length, for one vessel on each side of the outer end of the pier, and there are five berths alongside the breakwater, from 300 to 420 feet (91m4 to 128m0) in length. No. 1 berth is on the north-western side of the pier, and No. 2 berth is on the south-eastern side of the pier ; the depth alongside both berths is 20 feet (6m1). No. 7 is the outer berth on the north-western side of the breakwater, and the remainder run in decreasing numerical order along that side to No. 3, which is 1,900 feet (579m1) from the head of the breakwater ; the depth alongside Nos. 6 and 7 berths is 30 feet (9m1), alongside No. 5 berth 29 feet (8m8), No. 4 berth 26 feet (7m9), and No. 3 berth 22 feet (6m7).

A jetty extends in a south-south-westerly direction from the western side of the slipway at the head of the harbour, and its eastern side is available for boats at all states of the tide. A tide-guage, 12 feet (3m7) in height, painted black and white in horizontal bands, stands about half a cable south-eastward of the extremity of the jetty ; a rock awash lies close north-westward of the tide-guage.

Vessels making for the berths alongside the breakwater should steer in with the breakwater nearly end on, keeping the wharves close aboard.

Lights.—Beacons.—A light is exhibited, at an elevation of 87 feet (26m5), from a white mast, 38 feet (11m6) in height, situated near the south-western end of The Bluff.

A light is exhibited on the head of the pier, and another light is exhibited on the outer end of the breakwater ; the latter is difficult to identify when approaching the harbour, as it merges with the bright lights on the pier. The ordinary lights for illuminating the breakwater are reported to be conspicuous when approaching the harbour at night.

Leading beacons are erected at Chinwangtao. The front beacon (*Lat. 39° 55′ N., Long. 119° 37′ E.*) is situated near the beach about 6½ cables north-north-westward of the light on the head of the pier, and is a red diamond ; the rear beacon is situated nearly half a mile northward of the front beacon and is a white diamond. These beacons in line, bearing 352°, lead towards the entrance of the harbour.

The lights and beacons at Chinwangtao are maintained by the Kailan Mining Administration.

Pilotage.—Pilotage is carried out by the Kailan Mining Administration and is optional. There is no recognised pilotage ground, but vessels are usually picked up about 1½ miles outside the breakwater.

Signals.—Vessels must not attempt to enter the harbour unless they are instructed to do so by signal or otherwise ; if no signals are made, vessels must anchor clear of the fairway into the harbour.

By day, signals are made to vessels by the International Code of Signals from the signal station at the southern end of The Bluff.

At night, vessels approaching the harbour and wishing to berth must sound one long and one short blast on their whistles, when the following signal will be made from the yard under the light on the extremity of the breakwater, if the vessel is to berth there :—

Four *green* lights, disposed horizontally : denotes " come alongside."

Charts 3378, 598, 1256, 1262.

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Chart 2357.

After making out the above signal the vessel must sound one short blast, when the number of the berth will be signalled as follows :—

One *green* light on the west yard-arm	No. 3 berth.
Two *green* lights, disposed horizontally, on the west yard-arm	No. 4 berth.
One *green* light on each yard-arm	No. 5 berth.
One *green* light on the west yard-arm, and two *green* lights, disposed horizontally, on the east yard-arm	No. 6 berth.
Two *green* lights, disposed horizontally, on the west yard-arm, and one *green* light on the inner end of the east yard-arm	No. 7 berth.

If the vessel is to berth alongside the pier the following signals will be made from the yard under the light at the head of the pier :—

One *red* light on each yard-arm	Come alongside.
One *red* light on the west yard-arm	No. 1 berth.
One *red* light on the east yard-arm	No. 2 berth.

Tidal streams.—The ebb stream appears to sweep round Shallow bay, and sets across the entrance to the harbour ; vessels must, therefore, guard against being set on to the breakwater.

Southward of The Bluff the tidal streams set west-south-westward during the rising tide, and east-south-eastward during the falling tide, at a maximum rate of half a knot.

Shipping.—In 1935, 589 steam vessels with an aggregate of 1,339,696 tons entered the harbour. The largest vessel to enter in that year was of 5,787 net tons, 540 feet (164^{m}6) in length, and 21¼ feet (6^{m}5) draught.

Outer anchorage.—The best anchorage for large vessels is about three-quarters of a mile southward of the breakwater, with the pier and breakwater lights in line, bearing about 359°, in depths of from 4 to 5 fathoms (7^{m}3 to 9^{m}1). Small vessels can anchor westward of the pier and breakwater, where smooth water may be found with strong north-easterly winds.

There is also good anchorage about 2 miles south-eastward of the breakwater, in a depth of 6 fathoms (11^{m}0) ; or closer in, with Thumb peak (*Lat. 40° 07′ N., Long. 119° 28′ E.*) in line with the end of the breakwater, bearing 328°, distant about three-quarters of a mile from the latter, in a depth of about 5 fathoms (9^{m}1). When anchoring southward of the harbour, however, the swell is said to frequently make hard work unpleasant.

Town.—The native town, situated northward of the Peiping-Mukden railway, had, in 1933, a normal population of about 20,000 ; the greater part of the land southward of the railway is occupied by the Kailan Mining Administration, and in 1933 had a population of about 5,000.

There is a large glass factory with four chimneys, the westernmost being the highest, southward of the railway.

Harbour facilities.—Fresh provisions are obtainable. Water can be obtained alongside, or from water boats.

A large stock of coal is maintained, and can be loaded from the wharves at the rate of 100 tons per hour.

There is a well equipped hospital belonging to the Kailan Mining Administration, and there is also a Chinese isolation hospital.

Charts 3378, 598, 1256, 1262.

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Chart 2357.

Small repairs can be executed.

Chinwangtao is connected to the Chinese and Manchurian railway systems and to the telegraph system. There is regular steamer communication with Chefoo and Shanghai.

Chart 3378.

Coast.—The coast between Creek point and Shoal point, about 8½ miles eastward, is clear of dangers and the beach is steep-to; a cultivated plain extends to the foot of the mountains, which lie 4 to 5 miles inland and rise to an elevation of about 2,000 feet (609m6). A shoal, with depths of from one foot (0m3) to one fathom (1m8), was reported in 1924, to extend about 2 miles southward from Shoal point. The Ta shih ho or Ninghai river flows out westward of this point.

Shanhaikwan is a walled city situated about 4 miles north-westward of Shoal point.

The Great Wall of China now ends about one mile north-eastward from Shoal point; it rises generally to a height of from 20 to 30 feet (6m1 to 9m1), and with a thickness of from 15 to 25 feet (4m6 to 7m6). From Ninghai the wall turns north-north-westward, and after passing Shanhaikwan, strikes over the highly cultivated plains at the foot of the mountains; it then trends up one of the ridges and apparently along the higher portion of the chain.

Anchorage.—Anchorage can be obtained off Ninghai with offshore winds, in a depth of about 4 fathoms (7m3), thick mud, good holding ground; closer in the bottom is sand, and in depths of less than 2 fathoms (3m7) it is rocky. Northerly and easterly winds appear to raise the level of the water, and south-westerly winds to lower it; a high level of the water appears to precede a north-easterly gale by about 18 hours, and for some days afterwards the level of the water may be abnormally low.

During south-westerly winds landing can generally be effected on the beach under the lee of Shoal point (*Lat. 39° 57′ N., Long. 119° 48′ E.*), provided the boats can get in far enough, but there is a heavy surf during north-easterly winds, although this subsides quickly after the wind abates; it is stated to be always calm in the early morning.

Coast.—Dangers.—Temple head, about 6½ miles east-north-eastward of Shoal point, is cliffy and 120 feet (36m6) high; it is bordered by rocks to a distance of about half a mile offshore, and a shoal, with depths of from 2 to 3¼ fathoms (3m7 to 5m9), extends about one mile southward from the head. Needle rock, 40 feet (12m2) high and conspicuous, lies nearly one mile south-westward of the summit of Temple head, and there is foul ground between this rock and a point about one mile westward.

Chart 1256.

Northward of Temple head the land is mountainous a few miles from the coast, the ranges running north-eastward far beyond the head of the gulf. Although appearing from a distance as continuous ranges, many are distinct groups, separated by extensive plains, whilst their marked and peculiar forms render them useful landmarks. Mount Fisher is a double peak about 16 miles northward of Temple point and about 12 miles inland; about 4 miles farther northward is a sharp peak 1,800 feet (548m6) high, and a hill of irregular shape,

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Chart 1256.

900 feet (274m3) high, lies about 10 miles eastward of the sharp peak. Spur mountain, about 10 miles northward of Mount Fisher, has a long shoulder running eastward, at the end of which is a spur.

The coast between Temple head and Sand point, about 27 miles east-north-eastward, is low, and is fringed by shoals which extend nearly 2 miles in places; within the coast is an undulating plain about 10 miles broad, and there are several towers a few miles inland. A conspicuous white building stands amongst trees near the coast about 5 miles westward of Sand point, and a reef lies about half a mile off the point near the building.

Cruizer shallows are banks of coarse sand extending nearly 10 miles southward from Sand point; there is a least depth of 5 feet (1m5) on the central part of these banks, and they are usually marked by a long line of breakers even in moderately fine weather. There is a swashway, nearly 1½ miles wide, with a least depth of 6 fathoms (11m5), through the outer part of the banks. Vessels should, however, pass well outside the banks, in depths of not less than 13 fathoms (23m8), mud; a sandy bottom indicates their proximity, and the nearer the banks the cleaner the sand.

The tidal streams set northward along the coast during the rising tide, and south-eastward during the falling tide; they turn earlier near the coast than in the offing. The tidal streams are very strong over the shallows.

The coast between Sand point and St. Ubes point, about 6 miles north-north-eastward, is low and sandy, and is fronted by a flat, which dries out about one mile off St. Ubes point. Quarry hill, about 2½ miles north-westward of Sand point (*Lat. 40° 12′ N., Long. 120° 28′ E.*), is smooth, round, 180 feet (54m9) high, and has a large granite quarry on its southern side; Boulder hill, nearly 3 miles northward of Sand point, is 263 feet (80m2) high, and a pile of granite boulders on its summit has the appearance of a ruined tower; Double hill, about 3 miles northward of Boulder hill, is 200 feet (61m0) high, and has a double summit, on the northern of which is a group of temples. These three isolated hills are excellent landmarks, and appear as islands when first sighted. A small river flows out about 2 miles north-eastward of Sand point, and another river flows out immediately southward of St. Ubes point. There are depths of only 2½ fathoms (4m6) in places about 2 miles offshore between Sand point and St. Ubes point.

The coast between St. Ubes point and Warren point, about 7 miles north-north-eastward, is indented by a shallow bay; there are undulating brown hills, from about 70 to 100 feet (21m3 to 30m5) high, along its shores, and several low cliffy points, with rocks off them, alternate with small valleys fronted by sandy beaches. Warren point rises to a hill about 160 feet (48m8) high; foul ground extends nearly 1½ miles eastward from this point, and it should not be approached to a depth of less than 5 fathoms (9m1). There are numerous small villages in its vicinity.

Keuhwa tao, about one mile north-eastward of Warren point and on the edge of the drying coastal bank, is about 150 feet (45m7) high, covered with scrub, and steep-to on its seaward side; a reef, with a rock above water on its outer end, extends about 6 cables north-eastward from the north point of this island. Keuhwa tao lies off

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Chart 1256.

the entrance to a bay, the northern entrance point of which is about 2 miles northward of Warren point; this bay is almost entirely encumbered by mud flats which dry, except for a small area, with depths of from 7 to 9 feet (2^{m}1 to 2^{m}7), between Warren point and Keuhwa tao.

The coast between the northern entrance point of the bay just described and South Ningyuan point, about 5½ miles north-north-eastward, is low and is fronted by a mud bank which dries out to about one mile offshore. About 3½ miles north-westward of South Ningyuan point is a sharp peak, 536 feet (163^{m}4) high, with a square shoulder on its southern side, and close to the coast about one mile westward of this point is a hill 330 feet (100^{m}6) high.

The coast between South Ningyuan point and North Ningyuan point, about 9 miles north-eastward, is marshy, except for the first three miles, and is unapproachable on account of the flats, which dry, extending as much as 3 miles offshore. Cat rock, a black rock 26 feet (7^{m}9) high, lies on this flat and nearly 3 miles north-north-eastward of South Ningyuan point; a rock, 6 feet (1^{m}8) high, lies about one mile southward of Cat rock.

Table mountain, about 21 miles west-north-westward of South Ningyuan point, is flat-topped, with precipitous sides, and about 2 miles eastward of it is a mountain 2,000 feet (609^{m}6) high. About 12½ miles westward of South Ningyuan point is a hill with a double summit, 705 feet (214^{m}9) high, divided by a deep cleft; Mount Clarence, 1,329 feet (405^{m}1) high, is situated about 9 miles north-north-westward of South Ningyuan point, with a ridge of steep hills between them; the highest part of this ridge, nearly 3 miles south-eastward of Mount Clarence, is a double peak 1,061 feet (323^{m}4) high, with a peculiar mark down the side of its western summit. The high ranges northward of Mount Clarence are difficult to identify, but Coronet mountain, 1,080 feet (329^{m}2) high, situated nearly 3 miles north-westward of North Ningyuan point, is steep, symmetrical, and has a tower on its summit between two shoulders.

Off-lying islands and dangers.—Mopan shan (Saddle islet), about 5 miles south-eastward of South Ningyuan point, is saddle-shaped and is steep-to except for some rocks which extend about 4 cables northward from its north point. Another islet, 143 feet (43^{m}6) high, lies about 1½ miles northward of Mopan shan (*Lat. 40° 27′ N., Long. 120° 46′ E.*), and the passage between it and the rocks which extend northward from Mopan shan has irregular depths of from 2½ to 6 fathoms (4^{m}1 to 11^{m}0), sand.

Chuhwa tao lies with its southern extremity about 5½ miles eastward of South Ningyuan point; this island appears to be much farther offshore than is actually the case, as the land between South Ningyuan and North Ningyuan points is too low to be visible from a distance. Chuhwa tao is divided into two parts by a low, narrow neck of land; the hills in the south-western part attain an elevation of 600 feet (182^{m}9), and those in the north-eastern part an elevation of 648 feet (197^{m}5). The southern side is bold, and in some places precipitous. A long, narrow shoal, with a least depth of one foot (0^{m}3) over it, lies about one mile off the eastern side of the island and nearly parallel to it. A shoal, with a least depth of 4¾ fathoms (8^{m}7), lies about one mile southward of the south-east point of the island. The northern

Chart 1262.

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Chart 1256.

extremity of Chuhwa tao is a headland, 90 feet (27m4) high, connected to the island by a narrow neck of sand. Table islet, with a flat summit 74 feet (22m6) high, and cliffs all round, lies about three-quarters of a mile north-eastward of this headland ; Sail rock, close off the northern side of Table islet, is 54 feet (16m5) high. A bank, which dries, extends as much as one mile from the western side of Chuhwa tao, and is almost joined to the coastal bank.

Armytage reef, which dries 6 feet (1m8), lies about 3¼ miles eastward of Table islet and is steep-to, with depths of from 5 to 6 fathoms (9m1 to 11m0) around ; Mopan shan bearing 229°, and open its own breadth south-eastward of Chuhwa tao, leads close south-eastward of this reef. A rock, with a depth of 3 feet (0m9) over it, on which the sea sometimes breaks, lies nearly 1½ miles northward of Armytage reef ; a rock, which dries 2 feet (0m6), lies about 1¾ miles farther northward. In calm weather there are tide rips around these rocks. There are depths of over 5 fathoms (9m1) between Armytage reef and the shoal which lies about one mile off the eastern side of Chuhwa tao.

Anchorage.—Communication.—Small vessels with local knowledge can obtain anchorage, in depths of about 3 fathoms (5m5), about 2 miles eastward of North Ningyuan point. There is a landing place at this point.

Coast.—Hunter point, about 3 miles north-north-eastward of North Ningyuan point, rises to a steep, rugged range of hills, 776 feet (236m5) high, the summit of which is broken by a ravine, with a partially ruined tower on the outer part. Lienshan wan, a bay with a sandy beach at the head, lies immediately northward of Hunter point. Between the north-eastern entrance point of this bay and Hulutao promontory, about 7 miles east-north-eastward, the coast is bordered by steep hills, on the western of which is a low tower ; some rocks lie close to this stretch of coast, but there are depths of from 3 to 4 fathoms (5m5 to 7m3) half a mile offshore.

Hulutao harbour.—Hulutao promontory (*Lat. 40° 43′ N., Long. 121° 01′ E.*) projects about 2 miles eastward from the coast and is connected to it by a narrow isthmus ; its south-eastern extremity is a round headland or bluff, nearly 400 feet (121m9) high, from which foul ground, with a high pinnacle rock on it, extends fully half a mile eastward.

The construction of Hulutao harbour, on the southern side of the promontory, was commenced in 1931, and in 1934 considerable progress had been made on the main breakwater, which is to be nearly 7 cables in length, and the pier ; in the same year some of the retaining walls for areas under reclamation had been completed.

Hulutao is connected to the Chinese and Manchurian railway systems. It is an open port.

Chinchow bay.—Chinchow (Kin-cho) bay, entered between Hulutao promontory and a point about 7 miles north-north-eastward, is divided into two parts by a hilly point, 333 feet (101m5) high, with a tower on it. The entire bay is shallow, and mud flats dry out as much as 2 miles offshore. Tienkiaotsang (Ti-kia-tsung), the seaport of Chinchow (Kin cho) fu, is situated on the northern shore of the bay and is connected to the Chinese and Manchurian railway systems. Chinchow fu is situated about 15 miles northward of Tienkiaotsang and about 10 miles up the Siaoling ho.

Chart 1262.

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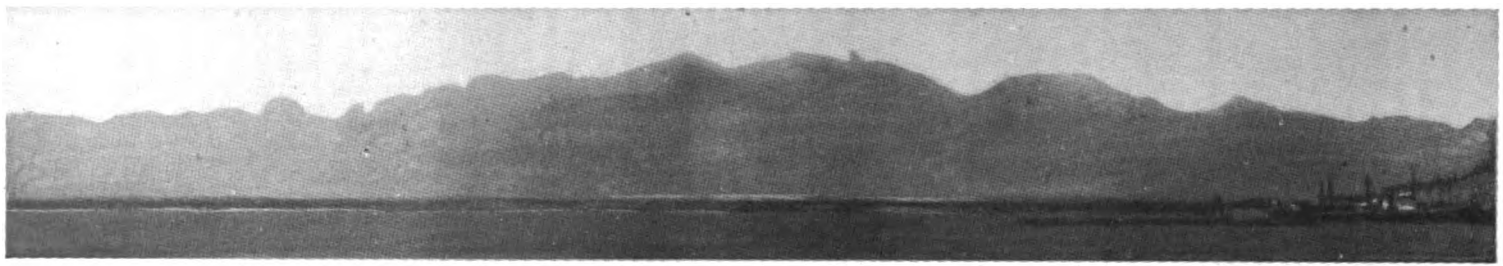
To face page 381.

Thumb peak.



Chinwangtao road.

(Original dated 1932).

Kaibyo tō,
from the south-westward, 11 *miles.*

Rokusan seikaku,
Lighthouse not shown.

Kwangtung peninsula.

Original dated 1860).

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Chart 1256.

Strata island lies about one mile southward of the northern entrance point of Chinchow bay, and is connected to it by a ridge of sand and shingle, which dries. The island has four round hills on it, the highest being 253 feet (77m1) high, and the stratification is laid bare along their western faces by landslips. A rock, which dries 2 feet (0m6), lies about 8 cables eastward of the north point of the island.

Coast.—Danger.—The coast for about 4 miles northward of the northern entrance point of Chinchow bay consists of a sandy beach ; thence for another 4 miles north-eastward it is cliffy, with hills close inland. Gulf hill, the highest of these hills, is situated about three-quarters of a mile within the coast and about 6 miles north-north-eastward of Strata island, and is 536 feet (163m4) high and conspicuous.

The Siaoling ho enters the gulf through some earth cliffs about 5 miles north-north-eastward of Gulf hill ; its narrow bed takes a southerly course through the mud flats, but it is only navigable for boats.

HEAD OF THE GULF OF LIAOTUNG.—Banks.—At the head of the Gulf of Liaotung is an extensive plain ; the coast is low, and mud flats, with long lines of fishing stakes on them, dry out from 3 to 5 miles. The Taling ho and several other rivers flow into the head of the gulf.

Kaechu banks extend southward from the coast from 20 to 35 miles eastward of Gulf hill to approximately Lat. 40° 37′ N. ; some of these banks dry, and there are very irregular depths over the remainder.

Chart 1798.

EASTERN SIDE OF GULF OF LIAOTUNG.—Rotetsusan seikaku.—Light.—Rotetsusan seikaku or Cape Laotieshan (Liau ti shan promontory) is the south-western extremity of the Kwantung peninsula and the eastern entrance point of the Gulf of Liaotung ; *see* view facing this page. Two white beacons, 24 feet (7m3) in height, are situated on this point, and are in line bearing 119°. The coast eastward of Rotetsusan seikaku is described in Chapter XII.

A light is exhibited, at an elevation of 315 feet (96m0), from a white circular iron tower, 37 feet (11m3) in height, situated on Rotetsusan seikaku. A fog signal is sounded from the light-station.

Coast.—The coast between Rotetsusan seikaku (*Lat. 38° 44′ N., Long. 121° 08′ E.*) and Chōso, a point about 3½ miles north-north-westward, is fairly steep-to, with depths of over 10 fathoms (18m3) about a quarter of a mile offshore ; rocks and reefs extend about 3 cables westward from Chōso, and there is a tidal race off the point.

Yōtō a is entered between Chōso and Daiyō (Tai yo) tō, a steep-to point, 470 feet (143m2) high, situated about 2½ miles northward. Sanyō tō, a promontory 233 feet (71m1) high, is situated at the head of the bay and divides it into two smaller bays ; the northern of the two is shallow, but it affords shelter to junks from the strong northerly and north-westerly winds which prevail in this locality. Yōtō a affords anchorage, but it is exposed to westerly winds.

The coast between Daiyō tō and a point about 2½ miles northward is fringed by a steep-to shoal which extends from one to 2½ cables offshore. Sōtō wan is entered between the latter point and Daikoso (Tai ko so), about 2½ miles north-north-westward ; a rock awash lies about 4 cables west-north-westward of the southern entrance point, and another rock awash lies about 4 cables northward of this point. Sō tō,

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Chart 1798.

an island 143 feet (43m6) high, lies in the middle of the bay and about one mile within the entrance; the portion of the bay eastward of this island is shallow, and most of it is occupied by a sandbank, which dries, but small vessels can obtain anchorage westward of Sō tō, although it is entirely open westward.

Seiko shi (Sai ko point), about one mile northward of Daikoso, is cliffy and steep-to; a shoal, with depths of less than 3 fathoms (5m5), extends about a quarter of a mile from the coast between these two points. The coast at Seiko shi is 637 feet (194m2) high, and about one mile northward of the point it is 587 feet (178m9) high. Dai tashi is situated about 2½ miles north-north-eastward of Seiko shi, and is the northern entrance point of a shallow bay; Henshi seki (Ogi Ishi), an islet 79 feet (24m1) high, lies about a quarter of a mile north-westward of Dai tashi, with a reef between.

Tidal streams.—The tidal streams along the coast between Rotetsusan seikaku and Seiko shi run approximately northward and southward. The north-going stream runs from between 2½ hours and 3½ hours after low water till between 2½ hours and 3½ hours after high water; the south-going stream runs from between 2½ hours and 3½ hours after high water till between 2½ hours and 3½ hours after low water. The maximum rate off the point is from 3 to 5½ knots, and tide races occur off Chōso and Seiko shi.

Off-lying islands and dangers.—Light.—Kaibyō tō lies with its eastern extremity nearly 3 miles south-westward of Daikoso. A reef, having some rocks which dry 2 feet (0m6) on its outer end, extends about 3 cables south-westward from the south-west point of Kaibyō tō, and a rock, which dries, 7 feet (2m1), lies about 4 cables westward of the island; there are strong eddies westward of this rock.

Shōryūzan tō, about 5 miles north-north-westward of Kaibyō tō, has a somewhat flat summit and cliffy coasts; it is steep-to, except for a shoal which extends about one cable from its southern extremity.

A light is exhibited, at an elevation of 182 feet (55m5), from a white circular concrete structure, 25 feet (7m6) in height, situated on the north-western extremity of Shōryūzan tō.

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KANTŌ WAN.—Kantō wan (Kwantung bay) is entered between Dai tashi and Daijin seki (Ta Zhunn shih), about 27 miles northward, and is divided into two parts by a rocky promontory; Kinshū wan (Kinchau bay), the southern arm, is separated from the northern part of Dairen wan by a neck of land about 2 miles across; Furanten kō (Pulan tien chiang) is the northern arm. The depths in the bay, excluding the two arms, are from 3 to 10 fathoms (5m5 to 18m3), and vessels can anchor almost anywhere, but the whole bay is open westward; small vessels can anchor under the lee of the various islands in the bay.

Islands and dangers.—Ō shū (Hung cho), a bank with depths of from 4 to 5 fathoms (7m3 to 9m1) over it, lies on the southern side of the entrance to Kantō wan, and extends about 3 miles north-eastward from a position about 4 miles north-eastward of Dai tashi (*Lat. 38° 57′ N., Long. 121° 07′ E.*).

Shū tō (Chu tao) lies about 8½ miles northward of Dai tashi and is inhabited; there is a small bay on its southern side which is reported to afford shelter to boats with northerly winds. A shoal, with depths

Charts 1392, 1256, 1262.

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Charts 1798, 2833.

of less than 3 fathoms (5^{m}5), extends about 3½ cables southward from the south-eastern extremity of Shū tō, and on the outer end of this shoal is Kōseki shō (Hung shih chiao), a rock which dries 3 feet (0^{m}9). Shohei tashi (Hsiao Pingtautze), a rock 45 feet (13^{m}7) high, lies about half a mile north-westward of Shū tō, and a rock, which dries 5 feet (1^{m}5), lies about a quarter of a mile northward of this island. Chō shū (Chang cho), a bank with depths of from 3½ to 5 fathoms (6^{m}4 to 9^{m}1) over it, extends about 7 miles north-north-eastward from a position about 3 cables northward of Shohei tashi. Byōgyū tashi (Mao Niutautze), an islet 143 feet (43^{m}6) high, lies about 4 cables eastward of Shū tō; Kaiyang chiao, 5 feet (1^{m}5) high, lies about a quarter of a mile northward of Byōgyū tashi and is connected to it by a reef.

Kohei tō (Huphing tao) lies about 1½ miles east-north-eastward of Kaiyang chiao; Tosen seki (Tung chuan shih), a rock 36 feet (11^{m}0) high, lies on a shoal which extends about 2 cables eastward from Kohei tō. Seisen seki (Hsi chuan shih), a rock 30 feet (9^{m}1) high, lies about half a mile westward of Kohei tō; foul ground extends about 6 cables westward from Seisen seki, and a 2-fathom (3^{m}7) patch lies about 4 cables southward of this rock. A 1½-fathom (2^{m}7) patch lies about 1¼ miles westward of Kohei tō. The depths around and between Shū tō and Kohei tō are very irregular.

Chart 2833.

Seimagi tō (Hsimai tao), about 11 miles north-eastward of Kohei tō, has a conspicuous stone shrine on its south-eastern extremity; a reef extends from one to 2 cables from the north-eastern side of the island. Tōmagi tō (Tungmai tao) lies about half a mile eastward of Seimagi tō. A rock, with a depth of 1¾ fathoms (3^{m}2) over it, lies nearly one mile southward of Tōmagi tō, and there are depths of less than 3 fathoms (5^{m}5) between; two rocks, one of which is 8 feet (2^{m}4) high and the other dries 2 feet (0^{m}6), lie between this rock and the south-east point of Seimagi tō. A shoal, with depths of less than 3 fathoms (5^{m}5), extends about one mile northward from Tōmagi tō, and on this shoal are three rocks; Teirishin (Ti-li-hsin), the southernmost of these, is about 5 feet (1^{m}5) high and somewhat flat; Hen tashi (Pientautze), the middle rock, is 65 feet (19^{m}8) high; the northernmost rock, situated about 8 cables northward of Tōmagi tō, is 25 feet (7^{m}6) high. Seki tashi (Kutautze), a rock 33 feet (10^{m}1) high, lies about 8 cables eastward of Teirishin, and a rocky head lies about 1½ cables south-eastward of Kutautze. Dai tashi (Tatautze), about 1¼ miles northward of Hen tashi, is a flat-topped islet 88 feet (26^{m}8) high; a conspicuous rock, 35 feet (10^{m}7) high, lies close off the south-western extremity of Dai tashi, and a reef extends about 1½ cables from the south-eastern side of this islet.

Chart 1798.

Southern side of Kantō wan.—About 3 miles eastward of Dai tashi (page 382) is the western entrance point of an open bay, which is about 2 miles wide at its entrance; a shoal, with depths of less than 3 fathoms (5^{m}5), extends about half a mile from the southern shore of this bay, and the eastern and western shores are fringed by sunken rocks which lie as much as 2 cables offshore.

Chōgyodai shi is a point 189 feet (57^{m}6) high, situated about 7¾ miles eastward of Dai tashi. Eijōshi wan (Ying Chengtze bay) is entered

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Chart 1798.

between Chōgyodai shi and Kōjiseki shi (Ho-urr shih-tsui), about 3¼ miles north-eastward ; the bay is shallow and a bank, which dries, extends as much as half a mile from the eastern shore. Ni tashi (Are tautze), an islet 193 feet (58m8) high, lies in the entrance of the bay and about one mile south-south-westward of Kōjiseki shi ; Kanzai tashi (Kuan-tsaitautze), 78 feet (23m8) high, lies about 4 cables westward of the southern extremity of this islet. Kan tashi (Kantautze), an islet 161 feet (49m1) high, lies about three-quarters of a mile eastward of Ni tashi and close off the northern shore of the bay. Kokugyo shō (Hei yu chiao), a rock 2 feet (0m6) high, lies about 8 cables westward of Kōjiseki shi. Anshi san (Antze shan) is a conspicuous double peak, 1,203 feet (366m7) high, situated about 6 miles eastward of the head of Eijōshi wan ; this peak bearing about 085° leads up the middle of the bay. Eijōshi wan is exposed to westerly winds, but small vessels, with a draught of less than 10 feet (3m0), can find shelter there with winds from other quarters.

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The coast between Kōjiseki shi and Chingsiechue (*Lat. 39° 04′ N., Long. 121° 22′ E.*), a cliffy point about 3¾ miles north-eastward, consists mostly of steep-to points with small shallow bays between ; the land in this vicinity is hilly, and Nandai san (Nanta shan), situated about 1½ miles southward of Chingsiechue, is the highest peak. Chingsiechue rises steeply to Hoku san (Pei shan), a hill 182 feet (55m5) high ; Seikō (Hsi kang), a ledge with several rocks, which dry, on it, extends nearly three-quarters of a mile westward from the western side of Chingsiechue and terminates in a rock awash ; Tōkō (Tung kang), a similar ledge, extends about 6 cables eastward from the eastern side of this point.

The coast between Chingsiechue and Chōsō gai (Niao chao yai), a dark cliff 155 feet (47m3) high, situated about 8 miles eastward, forms a wide bight.

Tidal streams.—Between Seiko shi and Chingsiechue the tidal stream runs north-eastward for a period of from 6 to 8 hours, commencing from 2 hours to 3 h. 20 m. after low water ; it attains its maximum rate, about 2½ knots, between 20 minutes and one hour before high water. The stream runs south-westward, with a maximum rate of 1½ knots, for a period of from 4 to 6 hours, commencing from 1½ to 3½ hours after high water. At Seiko shi the tidal streams run north and south, with a maximum rate of 3 knots ; there is a tidal race about one mile off this point.

Kinshū wan.—Light.—Kinshū wan (Kinchau bay) is entered between Chōsō gai and Ro tō (Lu tao), a rounded island, 306 feet (93m2) high, with precipitous sides, situated nearly 8 miles northward ; the bottom in this bay is soft mud, and mud flats dry out as much as 1½ miles from the head of the bay, so that the shore can only be approached at high water. There is a smooth, conspicuous bare rock on the coast about one mile eastward of Chōsō gai. Seigyo tashi, a rocky islet 43 feet (13m1) high, lies about 4 cables south-eastward of Ro tō. Hanka tashi (Fanchia tautze) lies about 2 miles south-eastward of Ro tō and half a mile off the northern shore of the bay, and is almost connected to that shore by a bank which dries.

Ro tō is separated from a headland on the main coast by a channel about 4 cables wide, with a least depth of 1½ fathoms (2m7) in the

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Charts 1798, 2833.

fairway; on this headland is Kyōbaku san (Chaonio shan), a precipitous hill 583 feet (177m7) high. Daishi san (Taitsu shan), 715 feet (217m9) high, is situated nearly 1½ miles east-south-eastward of Kyōbaku san.

The town of Kinshū (Kinchau) is situated on the low plain at the head of the bay, and contains a post office and a hospital ; the population in 1928 was 14,027. It is connected to the general railway and telegraph systems.

A light is exhibited, at an elevation of 76 feet (23m2), from a white wooden mast, 20 feet (6m1) in height, situated on the coast about 2 miles north-westward of Kinshū (*Lat. 39° 07′ N., Long 121° 42′ E.*).

The tidal streams in Kinshū wan run eastward from about one hour after low water till about one hour after high water, and westward from about one hour after high water till about one hour after low water ; the rate of either stream is not great.

Chart 2833.

Head of Kantō wan.—The coast between Kyōbaku san and Koku shi (Hei tsui), about 4½ miles northward, is indented by two shallow bays, separated from each other by a hilly peninsula which terminates westward in Rōkōsan (Lao hu shan) tō, situated about 1¾ miles northward of Kyōbaku san ; the southern bay is named Kō wan (Ho hai), and the northern bay is named Hokukai (Pei hai).

Kutsuryu tashi (Kulontautze), an islet 165 feet (50m3) high, lies about three-quarters of a mile south-westward of Koku shi and 4 cables offshore ; it is cliffy on its seaward side. A rock, with a depth of 2 fathoms (3m7) over it, lies about one mile south-south-westward of Kutsuryu tashi, and a shoal, almost awash, lies about 2 miles west-south-westward of this islet.

Northern side of Kantō wan.—Light.—Daijin seki (Ta Zhunn shih), the northern entrance point of Kantō wan, is the precipitous southern extremity of Seichu tō (Hsi chung tao), a hilly island divided into two parts by a sand flat about 2 miles from its southern end ; the summit of the island, about 600 feet (182m9) high, is situated about one mile north-eastward of Daijin seki. La Potze, a point on the western side of Seichu tō and about 2½ miles northward of Daijin seki, has a smooth round hill on it, 240 feet (73m1) high. Sand Hill bay is immediately southward of La Potze, and two rocks, which dry, lie within 4 cables westward of its southern entrance point, the sand on the lower slopes of the hills along this bay is conspicuous.

A light is exhibited, at an elevation of 245 feet (74m7), from a white circular concrete structure, 25 feet (7m6) in height, situated on Daijin seki.

Tōka kō (Tung tzia kau), entered between Daijin seki and Byōshō shi (Maochiao tsui), about 2½ miles eastward, affords anchorage to small vessels, in depths of from 1½ to 3 fathoms (2m7 to 5m5), but it is open southward. A rock, which dries 6 feet (1m8), lies about 3 cables west-south-westward of Byōshō shi. Rōta shi (Loutau tze), a rock 69 feet (21m0) high, lies nearly one mile northward of Byōshō shi and on the edge of the mud flat which dries out about 6 cables from the eastern shore of the bay ; this rock marks the eastern side of the entrance to a narrow channel, with depths of from one to 2 fathoms (1m8 to 3m7) for the first 1½ miles in a north-north-easterly direction, but the depth on the bar at its entrance is only one foot (0m3).

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Chart 2833.

Byōshō shi is the south-western extremity of Homei tō (Feng ming tao), an island 802 feet (244m4) high, which lies, with Seichu tō and several other islands, on the mud bank which extends from the coast eastward; this mud bank dries, but boats can pass over it at high water. Small vessels can obtain shelter off the southern side of Homei tō with northerly winds.

Untai san (Yun tai shan), a hill 500 feet (152m4) high, is situated on the mainland and about 5½ miles eastward of the south point of Homei tō. Dairen tashi (Talien tau tze), an islet with two peaks, 110 feet (33m5) high, lies about 1¾ miles south-westward of Untai san; Chiryūsei (Ti liu hsing), a rock 54 feet (16m5) high, lies about half a mile eastward of Dairen tashi; Senma tashi (Hsienmatau tze), an islet 146 feet (44m5) high, lies nearly 1½ miles east-south-eastward of Chiryūsei.

Sanryōsha shō (San liang chow chiao) is a narrow ridge of rocks, some of which dry from 3 to 5 feet (0m9 to 1m5), which extends about 6 cables west-south-westward from a position about 1½ miles south-south-westward of Senma tashi. To tō (Tu tao), nearly 1½ miles south-south-eastward of Senma tashi, is a somewhat flat, rocky islet, 110 feet (33m5) high; this islet stands on the outer edge of a bank, which dries, extending from the coast eastward of Untai san. Sha tashi (Shatautze), an islet 28 feet (8m5) high, lies about 2 miles south-westward of To tō, and a cleft runs across it from east to west; a reef extends about 1½ cables from the south-eastern side of Sha tashi.

Furanten kō.—Furanten kō (Pulan tien chang) is entered between To tō and Koku shi, and runs in a north-easterly direction for 10 miles to Haki tō (Pochi tao); it then turns abruptly eastward for a further 10 miles, until it reaches the town of Furanten at the head of the harbour. The surrounding district is an important salt producing centre, and there are also coal mines in the vicinity. Vessels with a draught of 18 feet (5m5) can enter the harbour at high water, but at low water it is only available for vessels with a draught of 12 feet (3m7); a heavy gale can make a difference of 2 feet (0m6) in the level of the water in the harbour. Furanten kō is an open port; *see* Regulations, page 43.

Koku shi (*Lat. 39° 17′ N., Long. 121° 35′ E.*), the southern entrance point of Furanten kō, is the north-western extremity of a hilly promontory, which rises about half a mile south-south-eastward of Koku shi to Seidai san (Hsi ta shan), a peak 310 feet (94m5) high; Daishi san (Taitze shan), about 2½ miles eastward of Seidai san, is 511 feet (155m7) high. Between the northern extremity of this promontory and a point about 7 miles north-eastward, on which is Gosando wan signal station, the coast is indented by a bight, which dries out as much as 1½ miles from the low-lying land at the head. This bight is divided into two parts by a point situated about 4½ miles eastward of Koku shi; the hills near the former point rise to an elevation of 285 feet (86m9), and Daichō san (Ta ting shan), a conspicuous hill 515 feet (157m0) high, is situated about 2 miles south-south-eastward of this point. The land at the north-eastern end of this bight is also hilly; Dai san (Tai shan) the highest peak in this vicinity, is situated about 6 miles north-eastward of Daichō san and is 705 feet (214m9) high.

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Chart 2833.

The northern shore of the outer part of Furanten kō is fronted by a broad bank, which dries; the outer edge of this bank runs from To tō to Pakojo, an islet which lies close off a point in the mainland about 8 miles north-eastward. Sanryō san (Sanlung shan), a hill 754 feet (229m8) high, is situated on the mainland about 6 cables west-north-westward of Pakojo; Daishi san (Taitze shan), 692 feet (210m9) high, is situated about 2¼ miles westward of Sanyrō san.

For administration purposes the line joining Daijin seki (page 385) and Seidai san is considered as the outer limit of the harbour, and the space within this line is divided into four areas, numbered consecutively from seaward.

Channel.—Islands and dangers.—Buoys.—Rōseki shō (La shih chiao), about 1½ miles north-eastward of Koku shi, is a rock, 16 feet (4m9) high, situated on the north-western edge of some foul ground; two rocks, which dry 3 feet (0m9) and 4 feet (1m2), lie a quarter of a mile and half a mile, respectively, south-eastward of Rōseki shō. A shoal, with a least depth of 3 feet (0m9), lies about 6 cables north-westward of Rōseki shō, and the fairway lies between this shoal and Rōseki shō.

Baikaku shū (Pei chue cho), a shoal with a least depth of 2 feet (0m6), lies about one mile north-eastward of Rōseki shō and on the southern side of the fairway; on the northern side of the fairway, and about 1¼ miles north-north-eastward of Rōseki shō, is a shoal with a depth of less than 3 feet (0m9). Gaisō tashi (Wai Shwangtautze) consists of two rocky islets about 3 cables apart, each 65 feet (19m8) high, connected to each other by a shoal with a least depth of 3 feet (0m9); these rocks are on the southern side of the fairway, and the south-western lies about 1¾ miles north-eastward of Rōseki shō. The fairway abreast Gaisō tashi is barely a quarter of a mile wide, and the northern side is formed by a bank which dries; this bank lies on the outer edge of a shoal, with depths of less than one fathom (1m8), which extends as much as one mile outside the coastal bank, which dries, extending from the northern shore.

A light is exhibited, at an elevation of 82 feet (25m0), from a white circular concrete structure, about 20 feet (6m1) in height, situated on the south-western islet of Gaisō tashi.

A narrow shoal, with a least depth of one foot (0m3) over it, extends about 1¼ miles north-eastward from a position about 6 cables east-north-eastward of the north-eastern islet of Gaisō tashi.

Chō tō (Chang tao) lies with its northern extremity about one mile south-eastward of the north-eastern islet of Gaisō tashi, and its southern extremity is on the outer edge of the drying coastal bank which extends from the southern shore of Furanten kō; Anshi san (Antze shan) is an islet close off the north-west point of Chō tō, and Kō tashi (Hwangtautze) is an islet lying nearly three-quarters of a mile west-south-westward of the southern extremity of Chō tō.

Sei tō (Ching tao) lies with its southern extremity mearly 3 miles north-eastward of the southern extremity of Chō tō and on the drying bank which extends from the southern shore of Furanten kō. Sha tashi (Tantotsu) is a rocky islet lying nearly half a mile north-westward of the north-west point of Sei tō. Shō tashi (Hsiaotautze) is an islet lying nearly three-quarters of a mile north-eastward of the north point of Sei tō and about one cable offshore; Dai tashi (Tatautze)

Charts 1256, 1262.

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Chart 2833.

lies about half a mile northward of Shō tashi (*Lat. 39° 21′ N., Long. 121° 44′ E.*), and there is another small islet close eastward of the former. A cylindrical light-buoy, painted red, and exhibiting a *white flashing* light *every four seconds*, is moored about 1½ miles westward of Shō tashi.

Haki tō (Pochi tao) lies with its southern extremity about 4 cables north-eastward of Dai tashi and on the southern side of the bend in the channel in Furanten kō; the summit of this island, 472 feet (143m9) high, is situated on its northern end. A bank, which dries, extends nearly three-quarters of a mile from the western side of Haki tō, and on the outer edge of this bank is Neishwang towtze, a rocky islet 105 feet (32m0) high; another rocky islet, 56 feet (17m1) high, lies nearly one cable farther westward. The latter islet forms the south-eastern side of the fairway, and is fairly steep-to on its western side; Pakojo marks the north-western side of the channel here.

A reef, with a depth of 2 fathoms (3m7) over it, lies about three-quarters of a mile south-westward of the 56-foot (17m1) high islet mentioned above and about 8 cables south-south-westward of Pakojo; this reef is marked by a conical buoy, painted red and black in horizontal bands, and surmounted by a sphere. The channel between Pakojo and the northern extremity of Haki tō is marked by three red conical buoys, each surmounted by a triangle.

Eastward of Haki tō the channel is narrowed by banks which extend from either shore and dry. A rock, 14 feet (4m3) high, lies about 3½ cables south-eastward of the north-east point of Haki tō and on the southern edge of the channel. Go Dairen tō (Ho-ta-lien tao) lies with its western extremity about 6 cables south-eastward of the north-east point of Haki tō; the channel runs along the northern side of this island, and there are depths of more than 5 fathoms (9m1) here in the fairway. Zen Dairen tō (Chien-ta-lien tao) lies close southward of the eastern part of Go Dairen tō. An electric overhead cable crosses the harbour from Zen Dairen tō to Go Dairen tō and thence to the mainland north-westward; the lowest part of the cable is 125 feet (38m1) above high water.

About one mile eastward of Go Dairen tō the channel widens to about half a mile, with depths of from 1½ to 3 fathoms (2m3 to 5m5), and then gradually narrows again to a width of about one cable. The head of the harbour is encumbered by a shallow mud flat, through which are narrow channels only suitable for boats. Kantō san (Kwang uing shan), a hump-shaped mountain about 6½ miles south-eastward of Zen Dairen tō, is conspicuous.

The town of Furanten is situated on the southern side of the head of the harbour, and is a station on the South Manchurian railway. The population in 1928 was 4,688. It is connected to the general telegraph system.

Anchorages.—There is good anchorage for vessels with local knowledge, in depths of from 3½ to 5 fathoms (6m4 to 9m1), in a blind channel which extends about one mile east-north-eastward from a position midway between Gaisō tashi and Chō tō.

There is anchorage for vessels with local knowledge, in depths of from 3 to 4 fathoms (5m5 to 7m3), about one mile westward of Dai tashi, and also farther up the channel, after passing Pakojo, in a depth of about 6 fathoms (11m0); vessels loading coal usually anchor westward of Dai tashi.

Charts 1256, 1262.

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Chart 2833.

Vessels with local knowledge can obtain anchorage northward of Go Dairen tō, and also about one mile farther up, where the channel widens out.

Tidal streams.—The tidal streams are fairly regular and set in the direction of the channel. Off Chō tō the in-going stream commences one hour after low water and runs for about 7 hours; the out-going stream commences about 2 hours after high water. Both streams attain their maximum rate, from 1¼ to 2¾ knots, between 3½ and 4 hours after high and low water.

Signals.—The following signals are made by flags of the International Code of Signals from either Seichu tō or Gosando wan signal stations:—

Signal.	*Signification.*
Flag A below a black cylinder	....Where are you from?
Flag B ,, ,, ,,	....Anchor as convenient where you are.
Flag C ,, ,, ,,	....Come closer.
Flag D ,, ,, ,,	....What is the state of health on board?
Flag E ,, ,, ,,	....The anchorage is not clear; wait where you are until you receive instructions.
Flag F ,, ,, ,,	....A vessel is leaving harbour from eastward of No. 4 area; you must wait temporarily where you are.
Flag G ,, ,, ,,	....Annul the last signal; look out for the signal about to be hoisted.
Flag H below a black ball	....Anchor as convenient in No. 3 area, keeping clear of the fairway for vessels passing through.
Flag I ,, ,, ,,	....Anchor as convenient northward of Haki tō in No. 4 area, leaving the fairway clear.
Flag J ,, ,, ,,	....Anchor as convenient eastward of Haki tō in No. 4 area, leaving the fairway clear.
Flag K ,, ,, ,,	....There is no anchorage northward of Haki tō; anchor temporarily in No. 3 area, leaving the fairway clear, until a further signal is made.
Flag L ,, ,, ,,	....There is no anchorage eastward of Haki tō; anchor temporarily in No. 3 area, leaving the fairway clear, until a further signal is made.
Flag M ,, ,, ,,	....The previously arranged berth is not clear; anchor temporarily in No. 3 area, leaving the fairway clear, and await instructions.

Charts 1256, 1262.

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Chart 2833.

A vessel receiving a signal must display either the same signal or the answering flag in reply.

As urgent signals may be made to vessels in the harbour, a good lookout must always be kept on the signal stations.

At night signals will be made by flashing lamp in the Morse code.

In all other respects the harbour regulations are the same as those for Dairen (page 562).

Directions.—Vessels from the south-westward should approach with Kyōbaku san (page 385) in line with the summit of Ro tō, bearing 064°, until Dai tashi bears 350° and is open eastward of Tōmagi tō, when they should steer for a position about half a mile north-westward of Ro tō (*Lat. 39° 11′ N., Long. 121° 34′ E.*) ; thence steer northward to pass about 2 cables westward of Kutsuryu tashi, taking care, however, to avoid the rock, with a depth of 2 fathoms (3m7) over it, which lies about one mile south-south-westward of this island.

Vessels approaching from the westward should pass about half a mile southward of Dai tashi and continue eastward until Kutsuryu tashi bears 045°, when they should steer for it on that bearing and pass about 2 cables westward of this island.

Vessels from the north-westward can approach by steering south-eastward so as to pass about one mile north-eastward of Dai tashi, taking care to avoid the shoal, almost awash, which lies about midway between Dai tashi and Kutsuryu tashi ; when the latter island bears 045° it should be steered for on that bearing, and passed about 2 cables westward.

Small vessels can approach the entrance to Furanten kō by steering eastward from a position about half a mile southward of Sha tashi (page 386) ; a least depth of 1¾ fathoms (3m2) can thus be carried over the bank eastward of this islet.

From the position about 2 cables westward of Kutsuryu tashi continue northward until the light-structure on the south-western islet of Gaisō tashi bears 054°, when steer for it on that bearing ; both islets of Gaisō tashi are in line with each other on this course, which leads about midway between Rōseki shō and the shoal, with a least depth of 3 feet (0m9), which lies about 6 cables north-westward. If proceeding to the anchorage between Gaisō tashi and Chō tō, steer for the northern extremity of the latter island when it bears 096° and anchor as convenient.

If proceeding up the inlet, vessels should pass about 1½ cables north-westward of Gaisō tashi, and then steer for the north-western extremity of Haki tō, bearing about 050° ; as the shoals on the northern side of the channel near Gaisō tashi are liable to change local knowledge is essential for this narrow passage.

COAST.—Hulushan bay.—Light.—Hulushan bay is entered between La Potze (page 385) and Pei chiao, a cliffy point about 5½ miles northward : the southern shore of the bay is formed by the north-western side of Seichu tō, described on page 385, and the northern shore is formed by the south-western part of Changsing (Chang hsing) tao, an island almost connected to the mainland, of which Pei chiao is the south-western extremity. The land within Pei chiao rises in irregular hills to Ta shan, the summit of Changsing tao, situated about 2½ miles north-eastward of this point, and then descends steeply eastward to a plain ; these hills appear as an island from a distance.

Charts 1256, 1262.

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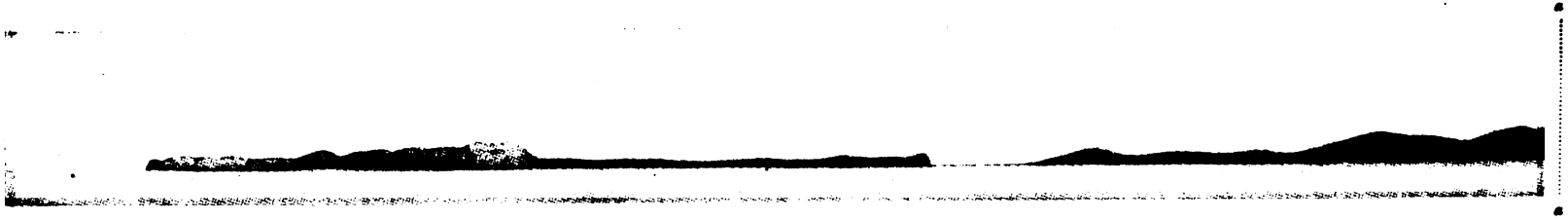
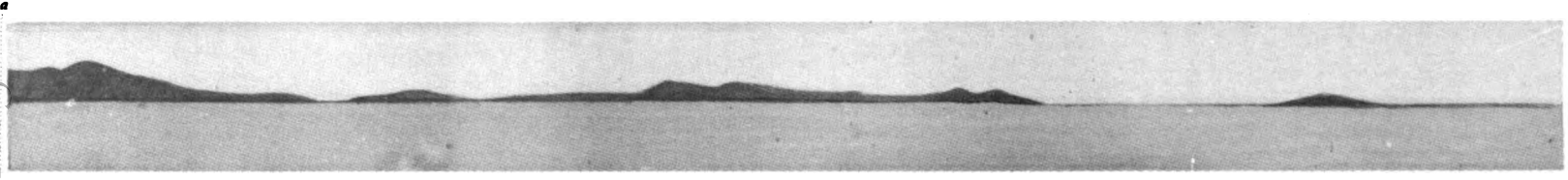
To face page 390.



Hulushan tsui.
bearing about 040°, 17 *miles.*



View, in two parts, of Hulushan bay approach.

(*Original dated 1860*).

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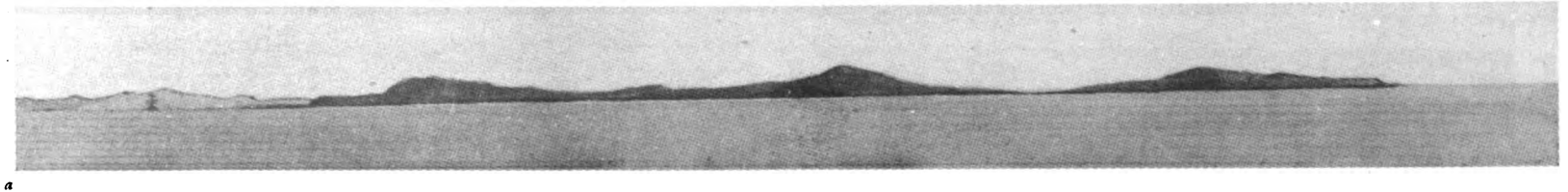
To face page 391.

Slaney head. *Machia tsui.* *Ta shan, bearing 080°, 5¼ miles.*



Hulushan tsui. *La Poize.*

View, in two parts, of Hulushan bay.

(Original dated 1860).

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Chart 2833.

Taiku shan is situated about 7 miles eastward of Ta shan and is the next highest peak on Changsing tao. *See* views facing this page and page 390.

A light is exhibited at an elevation of 656 feet (199m9), from a white circular concrete structure, 33 feet (10m1) in height, situated on a hill about 6 cables northward of Pei chiao (*Lat. 39° 31′ N., Long. 121° 13′ E.*).

Hulushan tsui is a projecting headland, 302 feet (92m0) high situated at the head of the bay and nearly 3 miles east-south-eastward of Pei chiao. Hulushan tsui is the northern entrance point of a narrow shallow channel, which runs in a north-easterly and easterly direction ; in the entrance there is a depth of barely 5 feet (1m5) over the bar.

Hulushan bay affords anchorage in depths of less than 8 fathoms (14m6), sand and clay, good holding ground, sheltered from all except westerly winds. Small vessels can anchor on the northern side of the bay, sheltered from north-westerly winds, or on the southern side, sheltered from south-south-westerly winds.

Chart 1256.

Outlying bank.—A narrow bank, with depths of from 5½ to 10 fathoms (10m1 to 18m3) over it, extends about 10 miles northward from a position about 20 miles south-westward of La Potze.

Chart 2833.

Coast.—Dangers.—Machia tsui, about 1¾ miles northward of Pei chiao, is a narrow point rising close within to a hill about 240 feet (73m1) high ; the coast between these two points is cliffy and steep-to. A shoal, with depths of from 4 feet (1m2) to 4 fathoms (7m3) over it, extends about 2 miles north-eastward from a position about 3 cables northward of Machia tsui ; this shoal is steep-to on the seaward side, and there are depths of from 6 to 8 fathoms (11m0 to 14m6) between it and the coast.

Slaney head, about 4¾ miles north-eastward of Machia tsui, is a rounded headland, 426 feet (129m8) high, with precipitous cliffs ; a reef extends about half a mile north-eastward from Slaney head, and Kao Naotze, a rock 70 feet (21m3) high, lies close off the cliff on the north-western side of the headland.

Fucho bay.—Dangers.—Fucho bay is entered between Slaney head and Fucho point, about 11 miles north-eastward, and has fairly regular depths, mud bottom, decreasing gradually from about 7 fathoms (12m8) in the entrance towards the head of the bay ; the northern side of Changsing tao forms the southern shore of the bay. Fucho point has a flat-topped hill on it, 79 feet (24m1) high ; a reef extends fully one mile westward from this point, and Ragged rocks, on the outer part of the reef, dry 4 feet (1m2). A bank, with depths of from 7 to 10 fathoms (12m8 to 18m3), extends about 3 miles south-westward from a position about 9 miles westward of Fucho point.

Maotze chiao lies about 3 miles north-eastward of Slaney head and dries 7 feet (2m1). A rock, 5 feet (1m5) high, lies about one mile southward of Maotze chiao and 4 cables offshore ; another rock, 30 feet (9m1) high, lies nearly 3 miles eastward of Maotze chiao and half a mile offshore.

Chunnchia tsui is a rocky headland at the head of the bay and about 7 miles north-eastward of Slaney head. Haotze tao, about 2½ miles north-eastward of Chunnchia tsui, is a flat-topped islet 85 feet (25m9)

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Chart 2833.

high, situated on the edge of the coastal bank which extends from the head of the bay. Between Chunnchia tsui and Haotze tao is the entrance to a channel, which separates the north-eastern extremity of Changsing tao from the mainland ; there are depths of from 1¼ to 2½ fathoms (2m3 to 4m6) in the entrance, but about one mile within there is a bar with a depth of only 4 feet (1m2). An island, with, with two hillocks on it 82 feet (25m0) and 69 feet (21m0) high respectively, lies on the southern side of the passage over the bar and about 2¾ miles eastward of Chunnchia tsui.

A good position for anchoring is with the western extremity of Chunnchia tsui bearing 176°, and the point about one mile eastward of this headland bearing 117°, in a depth of about 4½ fathoms (8m2) ; small vessels can anchor farther eastward.

Coast.—Off-lying shoals.—Hung shih tsui (Fort head) about 3½ miles northward of Fucho point, is a rounded headland 118 feet (36m0) high, and from 1¾ to 4 miles eastward of it are some hills which bear a remarkable resemblance to extensive fortifications. Between Fucho point and Hung shih tsui is a bay with depths of from 1¾ to 3 fathoms (3m2 to 5m5), the shores of which are fairly steep-to ; a stream flows through marshy land at the head of the bay. Wei lien to tsu, an islet 88 feet (26m8) high, lies about half a mile westward of Hung shih tsui (*Lat. 39° 48′ N., Long. 121° 27′ E.*).

A shoal, with a least depth of 4¾ fathoms (8m7) over it, lies about 1½ miles north-westward of Fucho point. A bank, with depths of from 5 to 10 fathoms (9m1 to 18m3), extends about 3 miles northward from a position about 2 miles west-south-westward of Wei lien to tsu ; there are depths of from 12 to 14 fathoms (21m9 to 25m6) between this bank and the coast.

Chart 1256.

Ping chiao (Glacis point) is situated nearly 5 miles north-eastward of Hung shih tsui, and rises gradually to a hill, 560 feet (170m7) high, situated about one mile south-westward of the point ; about 3½ miles farther south-westward is Le to shan (Proboscis peak), a double-topped hill, the southern peak of which is 1,020 feet (310m9) high and is curiously shaped. There are conspicuous sandhills along the coast between Hung shih tsui and Ping chiao ; two rocks lying close together, which dry one foot (0m3), lie about midway between these two points and about 6 cables offshore, and about half a mile farther north-eastward is a rock which dries 3 feet (0m9).

Nearly 5 miles north-eastward of Ping chiao is a point with a rock, 42 feet (12m8) high, lying close off it ; there is a bight between these two points, in the middle of which is a reef, with some rocks on it 30 feet (9m1) high. Schooner rock, 72 feet (21m9) high, lies close off a point about 7 miles north-eastward of Ping chiao and is very conspicuous.

About 5½ miles east-north-eastward of Schooner rock are some cliffs 160 feet (48m8) high ; a reef, which dries 7 feet (2m1), lies about 1½ miles south-westward of these cliffs. Helen bay is entered between a point about 3¾ miles north-eastward of the cliffs and Hsi lan chiao (Maxwell point), about 2½ miles northward ; the bay is shallow and the head of it dries. Hsi lan chiao is the extremity of a hilly promontory, and rocks extend about half a mile north-westward from it.

Sandy head, about 6 miles north-eastward of Hsi lan chiao, has a

Chart 1262.

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Chart 1256.

hill on it 400 feet (121^{m}9) high, the slopes of which are sand, and it is conspicuous from seaward of the Bittern shallows. Saddle bay, entered between Sandy head and Vansittart's Saddle, nearly 6 miles north-north-eastward, is shallow, and a bank, which dries, extends as much as half a mile from its shores. Within the coast between Hsi lan chiao and Sandy head, hills rise from the extensive plains to a maximum elevation of 925 feet (281^{m}9), whilst some 12 miles eastward of Vansittart's Saddle is a precipitous mountain chain which attains an elevation of over 2.000 feet (609^{m}6).

Vansittart's Saddle is a group of hills on a point projecting from a large plain; the two southern hills are 154 feet (46^{m}9) high, and a large square tower stands about one mile eastward of them. From the westward Vansittart's Saddle appears like an island with three saddles. A shoal, with depths of less than 3 fathoms (5^{m}5), extends nearly one mile from Vansittart's Saddle; a rock awash lies about half a mile south-westward of this point, and a 4-foot (1^{m}2) patch lies about 1½ miles north-westward of the point. A rock, with a depth of 3 feet (0^{m}9), over it, lies about half a mile northward of the point.

Bittern shallows.—Bittern shallows are banks of coarse sand, on which the sea breaks heavily during north-westerly and westerly winds, lying within 10 miles of the coast between McGowan cliffs and Vansittart's Saddle. The least depth on the outer bank, in a position about 9 miles westward of Vansittart's Saddle, is 1¾ fathoms (3^{m}2), whilst there is a least depth of 3 feet (0^{m}9) on the inner banks. The seaward side of the outer bank is steep-to, and there are channels, in which the depths are irregular, between the various banks.

Coast.—Dangers.—Tower hill (*Lat. 40° 18′ N., Long. 122° 06′ E.*), 421 feet (128^{m}3) high, rises on the coast about 9 miles north-north-eastward of Vansittart's Saddle, and has a conspicuous tower on its summit; about 1½ miles eastward of it is a hill 604 feet (184^{m}1) high. Some rocks lie in the middle of the bight between Vansittart's Saddle and Tower hill; the outer of these lies about three-quarters of a mile offshore and dries 13 feet (4^{m}0). A rock, with a depth of 4 feet (1^{m}2) over it, lies about 2¾ miles northward of Vansittart's Saddle. A 3-fathom (5^{m}5) patch, with depths of 4 fathoms (7^{m}3) and more around, lies about 5½ miles west-south-westward of Tower hill.

Eastward of a line drawn 6½ miles northward from the coast by Tower hill there are depths of less than 3 fathoms (5^{m}5), and just within this line are several patches with depths of from 3 feet to 1¼ fathoms (0^{m}9 to 2^{m}3). About 8½ miles north-north-eastward of Tower hill is a cliffy point with a pagoda on it; some rocks, which dry 3 feet (0^{m}9), lie about 3 cables westward of this point.

The coast between the point with a pagoda on it and the southern entrance point of the Liao ho, about 12 miles northward, consists of swampy land, fronted by a soft mud bank which dries out nearly 3 miles offshore. About 9½ miles eastward of the above-mentioned pagoda is a sharp cone 1,010 feet (307^{m}8) high, which is the highest peak of a range of hills. Kai chow ho, a stream which flows out about 3 miles north-eastward of the pagoda, becomes a torrent during rains.

Chart 2991.

LIAO HO.—The Liao ho rises in the highlands of Mongolia some 150 miles north-westward of Shanhaikwan, and winds its way through

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Chart 2991.

the Mongolian and Manchurian plains to enter the sea in the north-eastern corner of the Gulf of Liaotung. It was first surveyed in 1860, and it was then an excellent waterway; since the unprecedented floods of 1889 altered the channels, however, the volume of water and the depths have so decreased that the upper reaches are no longer of much use for water transport.

The lower part of the river passes through a plain only a few feet above sea level. Yingkow, situated about 13 miles above the bar, is a Treaty port; it can be reached by ocean-going vessels, which can cross the bar at favourable states of the tide, but it is ice-bound in winter.

Depths.—The Liao ho is at its highest level in July and August, which is the rainy season, and next to that in March and April, after the ice has melted; it is lowest in the autumn. The amount of water taken for irrigation purposes is stated to be increasingly affecting the level of the river.

Since the completion of the training walls at the entrance to the river the mean depth on the bar channel from June to November has been about 18 feet (5^m5) at high water spring tides and about 16 feet (4^m9) at high water neap tides; a southerly wind raises the water level on the bar, and a northerly wind lowers it. Any vessel which can cross the bar will have no difficulty in proceeding up to Yingkow.

Caution.—In 1936 it was reported that the Liao ho had shoaled considerably owing to silting; chart No. 2991 should, therefore, be used with extreme caution.

According to the latest determinations all longitudes shown on this chart should be decreased by 1° 50′. The true north of this chart is, according to the latest Chinese chart, in error; all bearings should, therefore, be decreased by 2°.

Ice.—The Liao ho is frozen over from December to March, inclusive, the exact dates varying according to the season; the ice is from 9 to 24 inches (0^m2 to 0^m6) thick. If not actually blocked by ice at the end of November, the river is then dangerous for navigation owing to drift ice. Steam vessels can enter the river two days after the thaw, but they must keep a lookout for drift ice for about 20 days subsequently.

Vessels remaining in the river after it has started to freeze should moor with two anchors close to the right bank, where it freezes later and the ice is thinner; they should not, however, remain later than November 20th. To winter in the river it is necessary to dig a dock in the river bank and secure the vessel inside it; *see* page 400.

Pilots.—A pilot schooner, having licensed pilots on board for the Liao ho, cruises near the light-vessel, except in bad weather. The schooner flies the pilot flag, red and white, and the words "Licensed pilot" are painted on the mainsail. The pilots are under the control of the Harbour master, by whose directions vessels are berthed. Pilotage is optional.

Chart 1256.

Off-lying shoals.—Shoals, with depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms (6^m4 to 8^m2) over them, lie south-westward of the entrance to the Liao ho and from 16 to 18 miles north-westward of Tower hill; in 1933 a depth of about $2\frac{3}{4}$ fathoms (5^m0) was reported about 20 miles north-westward of Tower hill. These shoals are a continuation southward of Kaechu banks (page 381).

Chart 1262.

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Chart 2991.

Newchwang light-vessel.—Anchorage.—A light-vessel, painted red, with *Newchwang* in white letters on her sides, is moored about 2 miles south-westward of the bar; a light is exhibited, at an elevation of 35 feet (10m7), from a steel tower. A fog signal is sounded from the light-vessel.

The light-vessel is withdrawn from about 15th November to 1st April on account of ice.

Anchorage may be obtained as convenient near the light-vessel, observing that the depths decrease gradually eastward.

Entrance channel.—The entrance to the river is approached over a bar of very hard sand, and the channel then leads between West and East banks, which dry, and extend some miles from the low entrance points of the river. The wooded banks of the river near its mouth are so low that they cannot be seen from the deck of a vessel at a distance of 7 miles.

The Bar signal station (*Lat. 40° 38′ N., Long. 122° 09′ E.*) is situated on the eastern side of the entrance to the river, and consists of a mast 125 feet (38m1) high, with a yard 95 feet (29m0) above the ground.

Training walls have been constructed on the banks on either side of the entrance channel. The eastern training wall, which uncovers, extends fully 6 miles in a south-westerly direction from a position about one mile south-westward of the Bar signal station; there are 6 beacons, each consisting of a pole surmounted by a disc, on this training wall, and they are numbered consecutively from No. 5, situated just within the inner end of the wall, to No. 10. which is situated on the outer end. On the western side of the channel is a submerged training wall nearly 1¾ miles in length, the outer end of which lies abreast the centre of the eastern training wall. West training wall extends about one mile southward from the western entrance point of the river.

Leading lights.—Buoyage.—Beacons.—West bank beacon, consisting of a pole surmounted by a sphere, is situated near the outer end of West bank and about 2 miles northward of No. 10 beacon on the outer end of the East training wall. East bank beacon, a pole surmounted by a triangle, is situated about 2¼ miles east-south-eastward of No. 10 beacon. North-west beacon, about 2¼ miles west-north-westward of the Bar signal station, is a black pole surmounted by a sphere.

Bar leading lights are situated on the eastern entrance point of the river; the front light is exhibited, at an elevation of 50 feet (15m2), from a tower-shaped iron structure situated nearly 2 miles southward of the Bar signal station; the rear light is exhibited, at an elevation of 80 feet (24m4), from a similar structure situated about half a mile east-north-eastward of the front light. These lights in line, bearing 060°, lead over the bar.

Entrance buoy is situated close north-westward of the Bar leading line and about 1¾ miles west-south-westward of the outer end of the East training wall; it is a light-buoy, painted black, exhibiting a *white flashing* light *every three seconds.*

Inner channel leading lights are situated near the Bar signal station; the front light is exhibited, at an elevation of 44 feet (13m4) from a tower-shaped iron structure situated close south-westward of the signal station; the rear light is exhibited, at an elevation of 73 feet (22m3), from a similar structure situated about half a mile north-

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Chart 2991.

eastward of the front light. These lights in line, bearing 040°, lead through the channel from the Middle buoy to a position off No. 7 beacon on the East training wall.

Middle buoy is moored on the south-eastern side of the channel and close southward of the intersection of the Bar leading line and the Inner channel leading line; it is a light-buoy, painted red, exhibiting a *red flashing* light *every three seconds*. Inner buoy is moored on the north-western side of the fairway and about 1¼ miles south-westward of No. 7 beacon on the East training wall.

West channel leading beacons are situated northward of the West training wall; the front beacon, situated nearly 3¼ miles northward of the Bar signal station, is 44 feet (13m4) high and is surmounted by a triangle; the rear beacon, situated about half a mile north-north-eastward of the front beacon, is 83 feet high, and is surmounted by an inverted triangle. There two beacons in line, bearing 015°, lead through the fairway from No. 7 beacon till nearly abreast No. 5 beacon.

West Fish stakes beacon, consisting of a pole surmounted by a sphere, is situated on the western side of the fairway and about 8 cables south-westward of No. 5 beacon on the East training wall; it marks the end of the fishing stakes which are set up each year, and is removed with the stakes in winter and replaced by a black spar buoy. A light-buoy, painted black, exhibiting a *white flashing* light *every three seconds*, is moored about 2 cables northward of West Fish stakes beacon and on the western side of the fairway.

No. 3 leading lights are situated southward of Old Fort (*Lat. 40° 40′ N., Long. 122° 10′ E.*), which is on the eastern side of the channel opposite the southern part of the West training wall: the front light is exhibited, at an elevation of 34 feet (10m4), from a wooden mast situated about 1¾ miles north-north-eastward of the Bar signal station; the rear light is exhibited, at an elevation of 57 feet (17m4), from a similar structure situated nearly 3 cables north-eastward of the front light. These lights in line, bearing 040°, lead through the fairway from No. 5 beacon to Middle bank buoy.

Two turning lights are situated near the Bar leading lights. The south-eastern of these two lights is exhibited, at an elevation of 50 feet (15m2), from a beacon situated about 1¾ miles southward of the Bar signal station and nearly 2 cables north-westward of the front Bar leading light; this light in line with the rear Bar leading light, bearing about 080°, marks the point of intersection of the Inner channel leading lights and the West channel leading lights. The north-western turning light is exhibited, at an elevation of 24 feet (7m3), from a beacon situated about 3 cables north-westward of the south-eastern turning light; these two lights in line, bearing 125°, mark a position on the alignment of No. 3 leading lights where a shoal extends nearly half way across the channel from the East training wall at No. 5 beacon.

Middle bank buoy is moored on the eastern side of the fairway and about 1¼ miles northward of the Bar signal station; it is a light-buoy, painted red, exhibiting a *red flashing* light *every three seconds*.

No. 4 leading lights are situated near the Bar signal station, the rear light of this leading line being also the rear light of the Inner channel leading lights; the front light is exhibited, at an elevation of 50 feet (15m2), from a wooden post situated about 3 cables northward of the

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DEPTH SIGNALS.

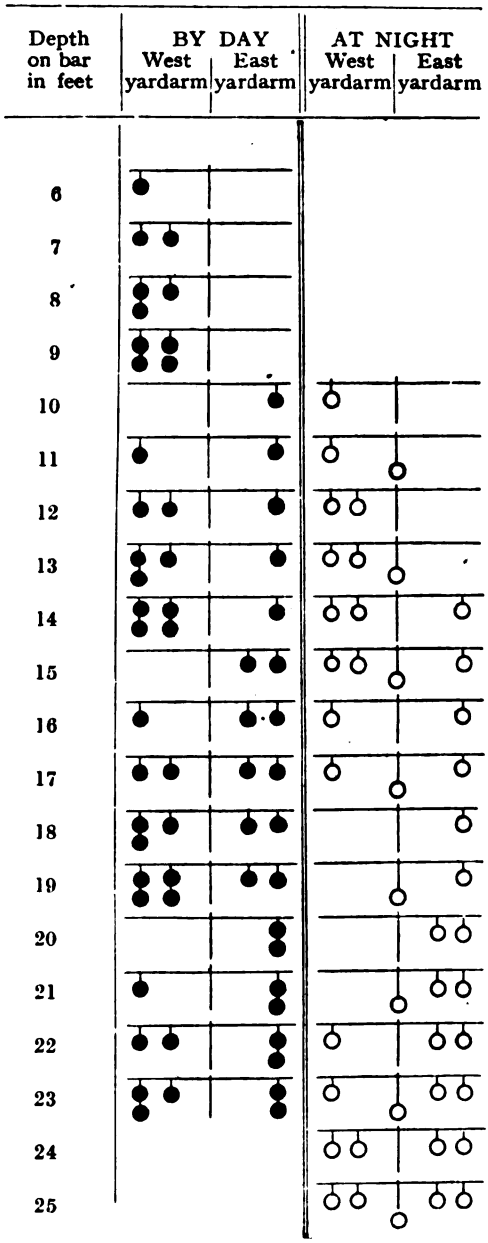

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Chart 2991.

rear light. These lights in line, bearing 174°, lead from Middle bank buoy to the turn by Yuang yuan chiao, situated nearly 4½ miles northward of the Bar signal station.

Three red spar buoys mark a line of piles for controlling the water on the eastern side of the channel between Middle bank buoy and a position about 2 miles northward; these buoys are numbered 1 to 3; No. 1 buoy is moored about 9 cables south-south-westward of Flagstaff beacon, a red and white pole surmounted by two diamonds, situated near Old Fort, and No. 3 buoy is moored about one mile north-north-westward of this beacon; No. 2 buoy is about midway between the other two.

Fish House Transit beacons are situated close northward of the northern end of the West training wall: the front or northern beacon is a pole surmounted by a black triangle, and the rear beacon is a pole surmounted by a black inverted triangle.

Everlasting point light-buoy, situated about 6 cables north-westward of Yuang yuan chiao, is a light-buoy, painted red, exhibiting a *red flashing* light *every two and a half seconds*; this light-buoy is moored off the edge of the bank which extends fully 4 cables north-westward from Yuang yuan chiao and dries. The outer edge of this bank is also marked by Railway Transit beacons, which are situated on the north bank of the river and about 8 cables northward of Yuang yuan chiao; these beacons are similar to the Fish House Transit beacons.

Harbour west leading lights (*Lat. 40° 41′ N., Long. 122° 11′ E.*) are situated on the southern bank of the river and at the western end of the town of Yingkow: the front light is exhibited, at an elevation of 34 feet (10^{m}4), from a wooden pole surmounted by a red triangle situated about 2 miles south-eastward of the front Railway Transit beacon; the rear light is exhibited, at an elevation of 50 feet (15^{m}2), from a wooden pole surmounted by a red inverted triangle situated about one cable south-eastward of the front light. These two lights are in line bearing 138°.

Leading lights are exhibited on the southern bank of the river about 3 cables eastward of the Customs flagstaff, which is situated about 1¾ miles eastward of the rear Harbour west leading light: the front light is exhibited, at an elevation of 30 feet (9^{m}1), from a white wooden pole surmounted by a triangle; the rear light is exhibited, at an elevation of 44 feet (13^{m}4), from the wireless mast of the Navigation Control office, situated about a quarter of a cable west-south-westward of the front light. These lights are in line bearing 245°.

Depth signals.—Depth signals, as shown in the diagram facing this page, are displayed from the Bar signal station; these signals are made by black balls by day, and by *white* lights at night. When the tide is rising, a black ball or a *white* light will be displayed at the masthead; when the tide is falling, a *green* light will be exhibited at the masthead at night.

Depth signals, indicating the depth inside the harbour above the level of low water, are displayed from the yardarm of the wireless mast at the Navigation Control Office:—

Signal.	*Signification.*
A square flag	3 feet
Two square flags, disposed vertically	4 ,,
Three square flags, disposed vertically	5 ,,

Charts 1256, 1262.

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Chart 2991.

Signal.	*Signification.*
One black ball	6 feet
A black ball above a square flag	7 ,,
A black ball above two square flags	8 ,,
A black ball above three square flags	9 ,,
Two black balls, disposed vertically	10 ,,

Tidal streams.—The ebb stream generally commences when the water level on the bar has fallen from one to 2 feet (0m3 to 0m6), and the flood stream after a corresponding rise of the tide. Outside the bar the stream sets north-north-westward at the commencement of the flood, and passing through north, ends setting north-north-eastward. The tidal streams set obliquely across the bar, the flood stream setting northward, and the ebb stream southward, with a maximum rate of from 2 to 4 knots.

It has been reported that the flood stream sets strongly across the West training wall on to the eastern bank of the river, and that during the ebb stream there is a set on to this wall.

Off Yingkow the tidal streams run up the river for from 4 to 5 hours, and down the river for from 7 to 8 hours; they may attain a rate of 6 knots. The effect of the wind on the water level is much the same as that on the bar. It is reported that with strong south to south-westerly winds high water occurs earlier, and that with strong north to east winds there may be practically no high water.

Dredging operations.—Whilst the dredger is at work she will display a black diamond shape at the masthead by day, and at night she will exhibit three *white* lights disposed vertically, vessels entering or leaving the harbour and observing a dredger at work are to observe the following instructions:—

(*a*) Vessels about to pass through the dredged channel are to display a black ball at the foremast head by day, and at night exhibit a *red* light not less than 6 feet (1m8) above the light on the foremast; a long blast is to be sounded on the siren at a suitable distance, and the dredger is not to be approached until she has answered by sounding a long blast on her siren.

(*b*) Vessels of shallow draught must not pass through the dredged channel unless it is essential for them to do so.

(*c*) Vessels passing close to the dredger must reduce speed to a minimum.

Directions.—The light-vessel is the only mark for identifying the entrance to the Liao ho, and it is often difficult to pick up this light-vessel, especially in the daytime, when there may be many vessels around waiting for a favourable tide; it has often happened that vessels who have not picked up the light-vessel have, whilst endeavouring to avoid the banks southward of the entrance, kept too far north-westward and have run on to the banks in that direction. A good plan, even for vessels coming from the direction of Taku, is to make the land considerably farther southward, where there are better landmarks, and then proceed northward for the light-vessel; a useful landfall for this purpose is Ta shan, the summit of Changsing tao (page 390).

When entering the river care should be taken not to confuse dredging and surveying beacons for those on the Eastern training wall; beacons for dredging purposes are erected at various times and may not be

Charts 1256, 1262.

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Chart 2991.

removed when no longer required. The bar and river being subject to change, local knowledge is desirable.

In 1932 it was reported that between Middle bank light-buoy and Ying yuan chiao there were many rows of fishing stakes, some of which extended well into the fairway.

Port of Yingkow.—The Port of Yingkow is off the city of Yingkow, which is situated on the southern bank of the river and about 2 miles above Ying yuan chiao (*Lat. 40° 42′ N., Long. 122° 10′ E.*). The lower limit of the port is a line drawn 230° from a position on the north bank about 3¼ cables west-north-westward of Ho-pei railway station, which is situated about 1¼ miles eastward of Ying yuan chiao; the upper limit is a line drawn 230° from the front beacon of the two beacons situated on the eastern bank of the river and about 2¼ miles north-eastward of the Customs flagstaff.

The banks of the river, being of mud and sand, are easily washed away, and the various shipping companies have bunded the plots belonging to them and have constructed wharves; apart from those of the South Manchurian Railway Company, however, these are somewhat primitive.

Owing to the shelving nature of the mud bottom, vessels must lie at a distance of about 60 feet (18m3) from the wharves, the intervening space being subsequently bridged by pontoons and gangways; when berthed at this distance vessels up to 18 feet (5m5) draught can use many of the wharves. The following procedure, which is adopted by the pilots, is recommended for vessels proceeding to the wharves:—

The berth is approached with slight headway and against the stream, with the ship's head converging about 10° on the wharf. The off-side anchor is let go when the vessel is exactly abreast her berthing position and nearly half a cable from the wharf. Cable is veered quickly to about 3 shackles; the vessel will then be approximately in her berthing position and wire hawsers can be passed to the shore. When the vessel is berthed a sampan will bring a wire hawser to the stern, by means of which the end of a permanent mooring cable may be hauled on board. These cables are secured to anchors laid well out in the river, and should be hauled taut and secured; in some cases the positions of the anchor of the moorings, which are laid opposite all the main wharves, are indicated by a large white anchor painted on the wall of a building abreast the moorings.

Anchorage.—The anchorage off Yingkow can accommodate 34 vessels up to about 4,500 tons. Vessels must moor in accordance with the regulations. The bottom is soft mud, and the holding ground is not very good, but it is said to be best below the Custom house. Vessels anchoring should veer cable to 45 fathoms (82m3); they should anchor in two lines, parallel to the bank and at a distance of not less than twice their own lengths, clear of the fairway.

The bed of the river may be altered by silt brought down by floods, or, to some extent, by the tidal streams. It is reported that every year in July and August, after the floods, a shoal with a depth of from 11 to 12 feet (3m4 to 3m7) forms off Jardine Matheson and Farmer wharves.

Prohibited anchorage.—An area on the southern side of the river, off the Harbour west leading lights, is reserved for Police vessels. The

Charts 1256, 1262.

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Chart 2991.

eastern limit of this area is marked by one beacon, and the western limit by two beacons; each beacon consists of a black and white post surmounted by a triangle.

Harbour regulations.—There are special harbour regulations for the port of Yingkow, full details of which can be obtained at the Harbour master's office. The following are extracts from these regulations:—

Anchorages.—(*a*) The anchorage, except for those vessels otherwise specified, is from abreast of the Middle Temple to the eastern end of the South Manchuria Railway Company's wharf.

(*b*) For vessels carrying mineral oil: As directed by the Harbour master.

(*c*) For vessels carrying explosives and for quarantine purposes: One mile below the anchorage (*a*).

Vessels wishing to berth outside anchorage (*a*) must obtain permission from the Customs authorities. All vessels entering will be boarded by the Berthing officer, who will allot the berth, which must not be shifted or left without a special permit. Vessels must shift berth if required to do so by the Harbour master. Applications to shift berth must be made at the Harbour master's office by the master, first officer, pilot or agents.

Vessels passing through the harbour must do so at a speed which will not inconvenience other vessels; when passing close to vessels which are berthed alongside they must reduce speed as much as possible without losing steerage way.

Vessels are not to have lines out to buoys, wharves, or other vessels any longer than is necessary when shifting their berths.

When drifting ice exists in the river, vessels must keep up steam and must take all practical precautions to avoid receiving or inflicting injury in the event of their breaking adrift or another vessel breaking adrift.

The use of steam whistles and sirens, except for the purpose of signalling in accordance with the "Regulations for Preventing Collisions at Sea," or for the purpose of warning vessels of danger, is prohibited.

Mud Dock.—H.M.S. *Algerine* passed the winter, from 14th November, 1901, until 28th March, 1902, in a mud dock, which had previously been dug, situated about a mile eastward of the British Consulate. In excavating a mud dock the sides should slope at an angle of not more than 45° with the bottom. The dock should be dug a few feet deeper than the dock sill, and should be of sufficient width for the bilge keels to pass clear; this extra width is also necessary on account of the sides breaking away during the winter frosts.

The dock used by the *Algerine* was dug at right angles to the bank of the river; it is considered that the process of docking would be less difficult if the angle was 70°. The rate of the stream off the entrance to the dock was 4 knots at high water.

When using such a dock the vessel's draught should be reduced as much as possible, and the time of docking should be about a quarter of an hour before high water.

Town of Yingkow.—The town extends for about 3 miles along the southern bank of the river, and is divided into two parts. The old and western part contains the Government offices, the Consulates,

Charts 1256, 1262.

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Chart 2991.

and most of the merchants' offices; the eastern part is the modern Japanese town. The China Customs house, (*Lat. 40° 41′ N., Long. 122° 14′ E.*) is a large, conspicuous building, with a flagstaff 100 feet (30^{m}5) high, situated in the eastern part of the old town. The British Consulate is situated close eastward of the Custom house.

In 1933 the population of Yingkow was 135,110.

Harbour facilities.—Fresh provisions can be obtained, but they are not plentiful. Water is supplied from water boats.

A large stock of coal is maintained.

Small repairs can be executed.

Yingkow is connected to the Chinese and the Manchurian railway systems. There is a regular steamship service to Dairen, Shanghai, and Hong Kong, and also to Japan. The town is connected to the general telegraph and telephone systems.

Storm signals are displayed from the flagstaff of the Customs house; *see* page 27.

There are several hospitals.

There is a British Consular officer at Yingkow.

Trade and shipping.—The principal exports are beans and their products, millet, coal, and spirits; imports are textiles, flour, sugar, dye-stuffs, and paraffin.

In 1932, the aggregate tonnage of shipping which entered the port was 1,109,821 tons.

Charts 1256, 1262.

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CHAPTER X.

THE EASTERN SIDE OF HWANG HAI OR YELLOW SEA,— QUELPART ISLAND; THE SOUTHERN PART OF THE WEST COAST OF KOREA, FROM KAINAN KAKU TO CHEMULPHO.

Chart 104.

QUELPART ISLAND.—Quelpart island, known as Saishū tō by the Japanese, is a large isolated island lying with its northern extremity about 47 miles southward of Kainan kaku (page 411), the south-west point of Korea; this island is described fully in the South and East coasts of Korea, East coast of Siberia, and Sea of Okhotsk Pilot, and, except for a few general remarks, only the western end is described here.

Kanda san (Mount Auckland) towers up in the centre of the island, far above any other mountains, and has two peaks; the western, 6,384 feet (1945m8) high, is a precipitous wall of rock, whilst the eastern, 6,328 feet (1928m8) high, is somewhat sloping; between these two peaks is a crater, the bottom of which is filled with fresh water, forming a circular lake about one cable in diameter. There are dense forests to about halfway up the mountain side, and above these there is a sparse growth of stunted trees; *see* view A on chart 104 and views facing this page. Gojōsei gaku (*Lat. 33° 23′ N., Long. 126° 30′ E.*), about 3 miles north-westward of Kanda san, is a sharp, wooded peak 3,857 feet (1175m8) high, and is very conspicuous from the north-eastward.

The entire surface of the island being formed of volcanic rock most of the rain is absorbed, forming subterranean streams, which gush out between rocks in various places on the coasts. The rivers mostly dry up, and usually exist only as water-courses, but as soon as rain falls they suddenly become raging torrents; only a few rivers flow throughout the year.

The population of Quelpart island, including Shūshi guntō (page 405), was 208,331 in 1930. The villages are built mainly in two lines around Kanda san, one line being along the coast, and the other round the foot of the mountains. The coastal inhabitants are partly fishermen and partly peasants; the remainder are engaged in agriculture and rearing cattle and horses.

Communications.—There is steamship communication from Saishi yū and from other small ports of the island with Korea and Japan, but as there are no secure anchorages round the island for other than small craft, the weather sometimes prevents vessels from calling.

There is a W/T station at Saishi yū, on the north coast of the island; *see* page 42.

South-western extremity of Quelpart island.—Funan kan

Charts 3480, 2347, 1262.

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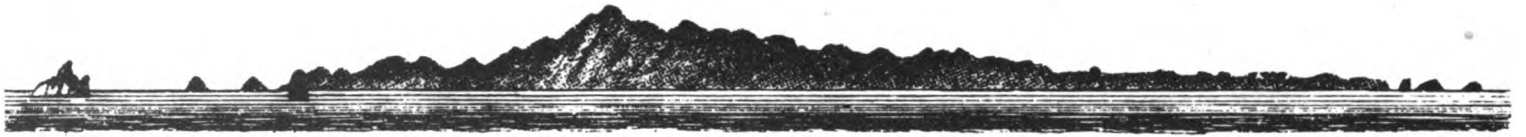
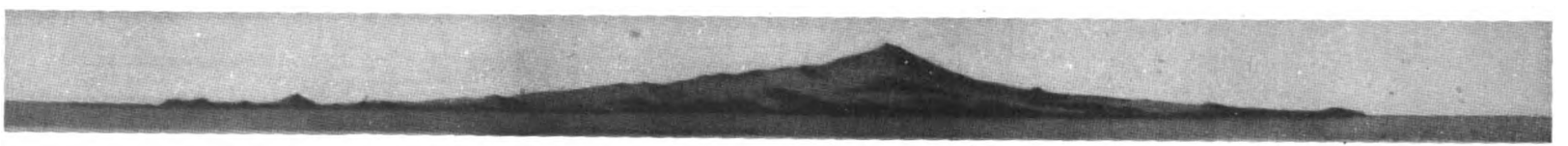


Ka tō. *Kaigan sho.* *Kanda san, bearing 124°, about 40 miles.*

Chiku tō. *Kanda san, bearing 066°, about 20 miles* *Kapa tō.*



Kanda san, bearing 052°, 22 miles.

Three views of Quelpart island.

(Originals dated 1898).

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Chart 104.

(Loney Cliff), at the south-western end of Quelpart island, is a small peninsula with mostly high and precipitous cliffs, rising to an elevation of 340 feet (103m6). Sanbō san, 1,274 feet (388m3) high, rises precipitously from the coast about 2½ miles north-north-eastward of Funan kan, and is the most conspicuous landmark in the western part of Quelpart island. The remainder of the land in the vicinity of Funan kan is flat and cultivated.

Off-lying islands and dangers.—Light.—Kapa tō (Barlow island) about 1½ miles south-south-westward of Funan kan, is a flat, inhabited island, 35 feet (16m8) high, surrounded by reefs and rocks, some of which dry, and which extend about 4 cables from the south-western side. A detached reef, with a depth of 3¾ fathoms over it, lies about 4 cables southward of the south point of the island, and some detached reefs, which dry, lie about the same distance south-eastward of this point. Kōhodan, a rock 8 feet (2m4) high, lies about 7 cables north-eastward of the east point of Kapa tō, and foul ground extends about half a mile northward and three-quarters of a mile southward from this rock.

Kafudan (Samarang rocks), about 1½ miles west-north-westward of Kapa tō, consists of three rocks, which dry about 9 feet (2m7); a reef extends about 2 cables northward and southward from these rocks, and there are depths of less than 10 fathoms (18m3) within a distance of about 3 cables of them.

Mara tō lies about 2½ miles southward of Kapa tō, and has a perpendicular rocky wall on its eastern side rising to an elevation of 117 feet (35m7); there are some dwellings on its western side. There are depths of from 7 to 8 fathoms (12m8 to 14m6) about a quarter of a mile off its northern and southern extremities, but elsewhere the island is steep-to. The channel between Mara tō and the foul ground off the southern side of Kapa tō is clear and deep, but the tidal streams are strong and there is generally a tide race.

A light is exhibited, at an elevation of 139 feet (42m4), from a white circular brick tower, 20 feet (6m1) in height, situated on the eastern side of Mara tō (*Lat. 33° 07′ N., Long. 126° 15′ E.*).

South-western side of Quelpart island.—Moshirupo kō is a small bay about 2½ miles north-westward of Funan kan, and it affords shelter to fishing vessels, protected by a rocky ledge and a breakwater. A flourishing trade is carried on here, and it is a port of call for the regular steamship lines. Fresh water gushes out on the shore of the bay; provisions can be obtained. Moshiru kō, an isolated, conical hill, 602 feet (183m5) high, is situated about one mile northward of the head of the bay and is very conspicuous.

The coast for about 4 miles north-westward of Funan kan is indented by several small bays, but, except for Moshirupo kō, they are all occupied by reefs which dry; for a further 5 miles north-westward there are practically no indentations, and the coast consists of boulders, with depths of over 10 fathoms (18m3) about 2 cables offshore. Kōsan gaku is a conspicuous rocky peak, 475 feet (144m8) high, situated on the western extremity of Quelpart island and about 9 miles north-westward of Funan kan; Kōsan ri, the largest village in the neighbourhood, is situated at the south-eastern foot of Kōsan gaku.

Seihi sho consists of two rocks lying nearly a quarter of a mile offshore south-westward of Kōsan gaku; the outer rock is 3 feet (0m9) high.

Charts 3480, 2347, 1262.

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Chart 104.

Shaki tō is the name given to two islets lying westward of Kōsan gaku. Chiku tō (Eden islet), the outer one, lies about three-quarters of a mile offshore and is 199 feet (60m7) high and covered with grass; Ga tō (Wooley islet), the eastern islet, is 137 feet (41m8) high and is rocky. The depths between these two islets are irregular, and a reef extends into the channel from the western side of Ga tō; a rock, which dries, obstructs the channel between Ga tō and the main coast. Small vessels with local knowledge can obtain temporary anchorage off the coast close northward or southward of Chiku tō.

Tidal streams.—The tidal streams off the south-western side of Quelpart island run parallel to the coast; they are strongest in the vicinity of Mara tō, where their maximum rate is about 3 knots.

North-western side of Quelpart island.—Anchorage.—Lights.—The coast between Kōsan gaku and a point about 5½ miles north-north-eastward is fringed by rocky ledges, but there are depths of 5 fathoms (9m1) about 2 cables offshore, and about 10 fathoms (18m3) three-quarters of a mile offshore. Between the above point and Unryū kan, nearly 3½ miles north-north-eastward, the coast is rocky and irregular, except for two white sandy beaches, and is fringed by rocky ledges which extend from one to 3½ cables offshore; there are several villages along this part of the coast, the principal being Kanrin ri, situated about 1¼ miles southward of Unryū kan, where there is a post office and a canning factory.

Hiyō (Piyan) tō lies nearly 2½ miles south-westward of Unryū kan and about three-quarters of a mile offshore; it is a conspicuous islet covered with grass, and has a basin-shaped summit, on the outer edge of which are four peaks, the highest, on the northern side, being 363 feet (110m6) high. The southern side of the island is somewhat flat and there is a small village; a cove on the south-eastern side affords shelter to boats, except with southerly winds. There is foul ground all round Hiyō tō, except on the north-eastern side, and this extends about three-quarters of a mile from the northern side of the island, and 6 cables from the western side; there are some conspicuous rocks above water close to the west coast. The passage between Hiyō tō (*Lat. 33° 25′ N., Long. 126° 13′ E.*) and the mainland is narrowed by the shoals extending from either side to a breadth of about 2 cables, with depths of from 3 to 4¼ fathoms (5m5 to 7m8), and it is only navigable for small vessels with local knowledge.

Hiyō tō byōchi is the name given to the anchorage southward and eastward of Hiyō tō; the bottom is rocky and uneven in parts, and anchors are liable to foul. The southern anchorage is about midway between the southern side of Hiyō tō and the main coast southward, in depths of from 7 to 17 fathoms (12m8 to 31m1), sand and shells; this anchorage is not good with winds between south and north-west. The eastern anchorage is about midway between the east coast of Hiyō tō and the coast of the main island eastward, in depths of from 7 to 8 fathoms (12m8 to 14m6), sand; this anchorage is bad with northerly winds. The tidal streams set north-eastward and south-westward; near Hiyō tō they have a maximum rate of about 2½ knots.

Chiku tō is a low islet lying close to the coast, and connected to it by a rocky ledge, about half a mile northward of Kanrin ri. A rocky ledge, with a breakwater on it, extends about 4 cables southward from the western end of this islet, and another breakwater extends about one

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Chart 104.

cable in a north-westerly direction from Kanrin ri; the passage between the heads of these two breakwaters is about one cable wide, and the area enclosed by them forms a safe harbour for small craft. A light is exhibited from both the northern and southern extremities of the northern breakwater, and also from the head of the southern breakwater; each of these three lights is exhibited, at an elevation of 19 feet (5m8), from an iron column 14 feet (4m3) in height.

Hiyō tō byochi is visited by the regular liners. Storm signals are displayed at Kanrin ri; *see* page 38. Fresh provisions are obtainable.

Gaigetsu kan (Roberton point) is situated about 3 miles north-eastward of Unryū kan. Kōnai hō, a hill 563 feet (171m6) high, with an old beacon on its summit, is situated about 1¼ miles east-south-eastward of Gaigetsu kan and half a mile inland. The coast eastward of Gaigetsu kan is described in the South and East coasts of Korea, East coast of Siberia, and Sea of Okhotsk Pilot.

Chart 3365.

Islet and rocks northward of Quelpart island.—Kaigan sho (Sea rock) lies about 12 miles northward of Gaigetsu kan, and is a steep-to pinnacle rock, 169 feet (51m5) high; *see* view facing page 402.

Ka tō (Flower islet), about 4½ miles north-eastward of Kaigan sho, has a flat summit 281 feet (85m6) high; there are depths of over 20 fathoms (36m6) at a distance of about one cable around this islet, except on the western side, which shelves more gradually.

059°, 1½ *miles.* 291°, 1½ *miles.*

Ka tō

(Original dated 1922).

Nakano se, about 4½ miles north-north-westward of Ka tō, is a rock with a depth of 3½ fathoms (5m9) over it.

SHŪSHI GUNTŌ.—Shūshi guntō (Chuja group) consists of a number of islands and rocky islets lying from 24 to 33 miles northward of Gaigetsu kan. There is foul ground around many of the islets, and vessels without local knowledge should not attempt to pass through the group except in case of necessity. *See* view facing page 406.

Zetsumei sho (Ninepin rock), the southernmost of the group, is a conical rock, 159 feet (48m5) high; there are heavy tide-rips within a distance of a mile north-eastward of this rock. A steep-to rock, with a depth of 6 fathoms (11m0) over it, lies about 7 cables south-eastward of Zetsumei sho.

Suitoku tō (Bott rock) lies about 2½ miles north-eastward of Zetsumei sho and is conspicuous; its northern side consists of precipitous cliffs rising to an elevation of 415 feet (126m5). About 1¾ miles westward of Suitoku tō is an islet, 111 feet (33m8) high, and a 3½-fathom (6m4) patch

Suitoku tō from the south-westward.

(No original).

Charts 3480, 2347, 1262.

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Chart 3365.

lies about 3 cables south-eastward of it. Sei tō (*Lat. 33° 55′ N., Long. 126° 19′ E.*), about three-quarters of a mile north-westward of Suitoku tō, is 350 feet (106m7) high.

Ge-Shūshi tō, the largest and highest island of the group, lies with its southern extremity nearly one mile northward of Sei tō; its summit, situated in the middle of the northern part of the island, is 533 feet (152m5) high. Foul ground extends about 3 cables from the south-east point of Ge-Shūshi tō, and a reef, with a depth of 2 fathoms (3m7) over it, lies about 6 cables south-eastward of this point. A rock, 212 feet (64m6) high, lies about 2 cables off the middle of the west coast, and a rock, which dries 3 feet (0m9), lies about 6 cables west-south-westward of the western extremity of the island; a rock, 51 feet (15m5) high, lies about midway between these two rocks. There are several rocks off the northern side of the island.

Jō-Shūshi tō (Sober island), the second largest island of the group, is separated from the western extremity of Ge-Shūshi tō by a narrow channel and is 484 feet (147m5) high.

Hō sho (South Black rock), the south-easternmost rock of Shūshi guntō, lies about 3¼ miles south-eastward of the east point of Ge-Shūshi tō and is 45 feet (13m7) high. Gyūbi gan (North Black rock), about 2 miles north-north-westward of Hō sho, is 41 feet (12m5) high, and Gyūtōri tō, about one mile northward of Gyūbi gan, is 192 feet (58m5) high. Bō tō (Remi islet), the north-easternmost islet of the group, lies about 1¾ miles north-north-eastward of Gyūbi gan and is 215 feet (65m5) high.

Ōkan tō (Whale island) lies about 2 miles west-north-westward of Bō tō and is the northernmost island of the group; it has two peaks, the eastern and higher attaining an elevation of 507 feet (154m5), and there is a village between them. Roku sho, a rock 38 feet (11m6) high, lies about one mile westward of the west point of Ōkan tō. There are several other islets and rocks southward and south-eastward of Ōkan tō, and the positions of these are best seen on the chart.

Chokuki tō (Ripple island), the north-westernmost island of the group, lies about 4 miles west-south-westward of Ōkan tō, and a rock, 9 feet (2m7) high, lies about midway between.

Anchorages.—Light.—Shūshi kō, a small bay on the eastern side of Jō-Shūsi tō, affords good anchorage for small vessels with local knowledge, and it is visited regularly by vessels from Mokuho in Korea. The two villages Eiko ri and Daisei ri are situated on the southern and northern shores of the bay, respectively, and there is a post office at the latter.

A light is exhibited, at an elevation of 43 feet (13m1), from a black circular concrete structure, 40 feet (12m2) in height, situated on a rock on the southern side of the entrance to Shūshi kō.

Anchorage can be obtained, by vessels with local knowledge, about half a mile off the north coast of Ge-Shūshi tō, in depths of from 11 to 15 fathoms (20m1 to 27m4), with the summit of this island bearing about 180°, but as the bottom is very rocky, this cannot be considered a good anchorage. A better position is off the east coast of this island and south-eastward of its summit, in depths of from 10 to 11 fathoms (18m3 to 20m1), sand.

Tidal streams.—The tidal streams in general set north-westward from about 2½ hours after low water to about 2½ hours after high

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Ka tō. *Suiloku tō, bearing 240°, 7 miles.*

Ōkan tō.

View, in two parts, of Shūshi guntō.

Original dated 1884).

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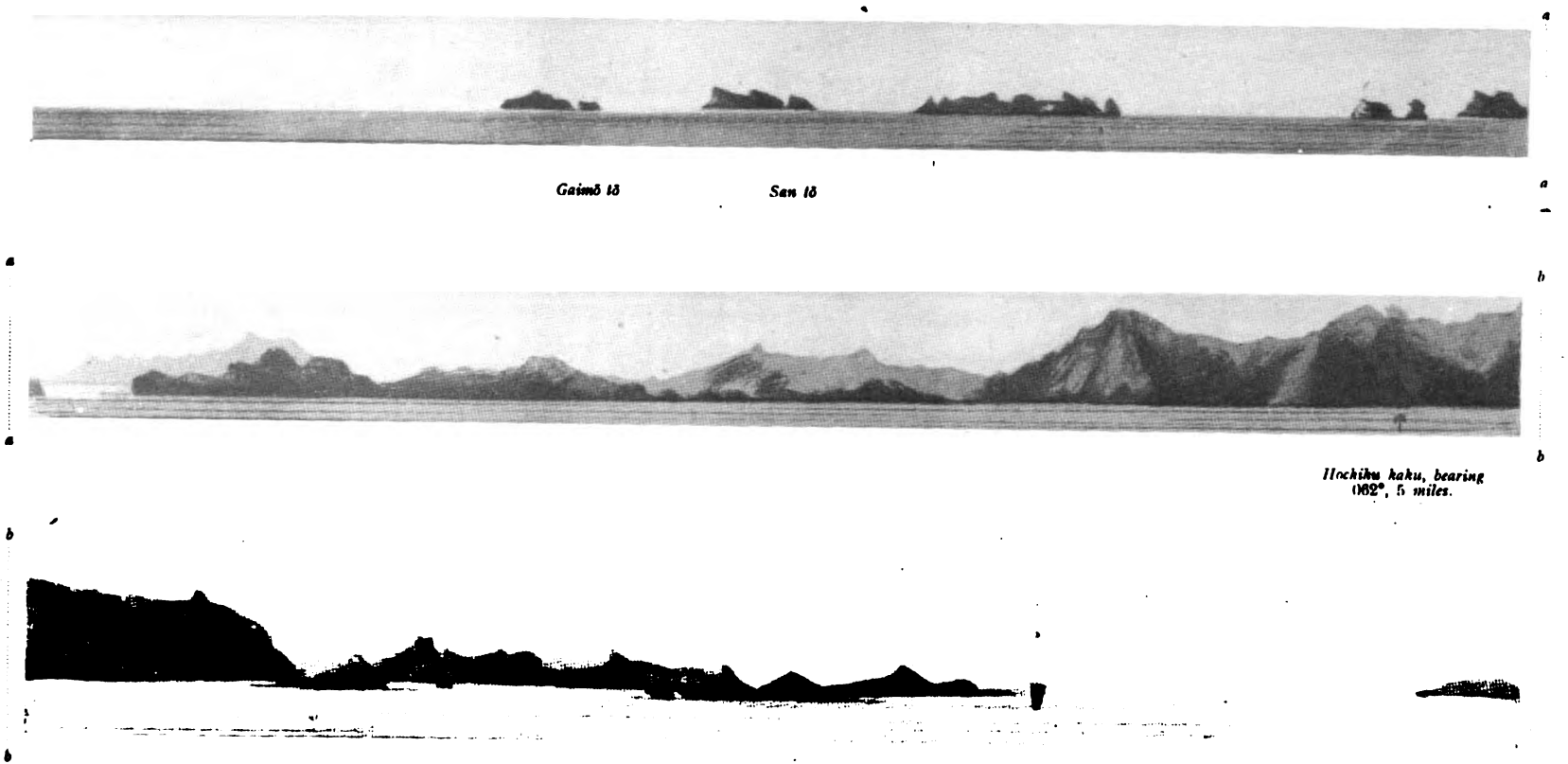
To face page 407.



View, in three parts, of Shoan guntō.

Original dated 1863).

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Chart 3365.

water, and south-eastward from about 2½ hours after high water to about 2½ hours after low water; the maximum rate at spring tides is about 2¼ knots, but in the narrow channels between the various islands of the group they may attain a rate of 5 knots, and in such cases heavy overfalls occur.

Eddies are experienced between Ōkan tō and Bō tō (*Lat. 34° 00′ N., Long. 126° 23′ E.*), and tide rips are common.

Abnormal magnetic variation.—Abnormal magnetic disturbance, with a deflection of the needle westward, has been reported northward of Shūshi guntō.

Islet eastward of Shūshi guntō.—Shōsui tō (Maisonneuve) lies about 12 miles eastward of Hō sho, and has a flat, thickly wooded summit; except on the northern side there are vertical cliffs around the islet, which is steep-to. There are a couple of dwellings on the northern side, which are stated to be occupied temporarily during summer.

Charts 1558, plan of Shoan kō, and 3365.

SHOAN GUNTŌ.—Shoan guntō lies north-eastward of Shūshi guntō and southward of Kainan kaku (page 411), the south-west point of Korea, and consists of the three large islands Hokitsu tō, Roka tō, and Shoan tō, several smaller islands and islets, and numerous rocks. *See* view facing this page.

Chart 1558, plan of Shoan kō.

Shashi tō.—Lights.—Shashi tō, the southernmost island of Shoan guntō, lies nearly 11 miles northward of Shōsui tō; its coasts are mostly steep, with occasional shingle beaches, and the south-east and north-east points of the island are cliffy. Heigan san, the summit of the island, is situated on the southern side, and is a sharp peak 566 feet (172^{m}5) high. Shashi tō is wooded, and it is an excellent landmark for vessels passing southward of the group. Bokusei tō lies about 4 cables westward of the northern end of Shashi tō, and has perpendicular cliffs on its southern side; a shoal extends a short distance from its northern side.

A light is exhibited, at an elevation of 311 feet (94^{m}8), from a white circular concrete tower, 20 feet (6^{m}1) in height, situated on the south-eastern extremity of Shashi tō. An auxiliary light is exhibited from the same tower. A fog signal is sounded from the lighthouse, and a W/T fog signal is transmitted.

There is a W/T D.F. station on Shashi tō; *see* page 42.

Dangers.—Izumo shō (Schwerdt rock, chart 3365) is a pinnacle rock, awash, lying about 4½ miles west-south-westward of the south-west point of Shashi tō; with strong winds and tidal streams the sea breaks over it. The summit of Shoan tō, the easternmost island of Shoan guntō, in line with Bokusei tō, bearing about 058°, leads fully half a mile north-westward of this danger. At night it is covered by the auxiliary *red* light of Shashi tō.

A bank, with a depth of 10 fathoms (18^{m}3) over it, lies about 2½ miles south-south-westward of Shashi tō lighthouse.

Shashi tai is a shoal of sand and shells, with a least depth of 3½ fathoms (5^{m}9), lying about 6 cables north-eastward of the north-eastern extremity of Shashi tō.

Hokitsu tō.—Hokitsu tō, the south-western island of the group,

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Chart 1558, plan of Shoan kō.

lies with Hochiku kaku, its south-western extremity, nearly 4 miles west-north-westward of Shashi tō; it is densely wooded and has many sharp peaks. Hokitsu tō is divided into two parts, joined together by a low, narrow neck about 3 cables in length. The western part is hilly, with a deep valley running in from the north-east coast to within about a mile of the south-western extremity; Shōshin hō, the summit of the island, 1,416 feet (431m6) high, is situated on the southern side of this valley and nearly 1¾ miles north-eastward of Hochiku kaku (*Lat. 34° 07′ N., Long. 126° 31′ E.*), The latter has a conspicuous hil[1] on it, 638 feet (194m5) high; Bōgetsu hō, about three-quarters of a mile northward of Hochiku kaku, is a conspicuous rocky peak, 1,205 feet (367m2) high.

Several islets, rocks, and reefs lie within a distance of one mile from the west coast of Hokitsu tō, and the positions of these are best seen on the chart. Ya tō consists of two rocky islets, the southern of which is 156 feet (47m5) high and lies about half a mile south-eastward of Hochiku kaku; the tidal streams attain a rate of from 3½ to 4 knots in the vicinity of these islets. Reisaku tō lies close off the coast about 2½ miles east-north-eastward of Hochiku kaku, and has a sharp summit 471 feet (143m6) high; a 3½-fathom (6m4) patch lies about 3 cables westward of the south-west point of Reisaku tō, and Shō tō, an islet 208 feet (63m4) high, lies close off the south-east point of Reisaku tō and is connected to it by a reef.

The eastern part of Hokitsu tō is indented by several bays, but those on the northern side are entirely occupied by mud flats which dry. Fuji kaku, the southern extremity of this part, has a very conspicuous rocky hill on it. Ki tō lies about 7 cables westward of Fuji kaku, and bears some resemblance to a horse lying down, with its head raised and facing eastward; An tō is a saddle-shaped islet lying about half a mile southward of Ki tō. Shogan kaku, the east point of Hokitsu tō, has a conspicuous square boulder on it; Hachō san is a sharp peak situated about 4 cables north-westward of Shogan kaku.

Roka tō.—Roka tō lies northward of Hokitsu tō, and is separated from it by Datō suidō, a narrow channel only suitable for small craft. There are depths of only about 1½ fathoms (2m7) off the western entrance to this channel, and the eastern entrance is encumbered with islets; the tidal streams attain a rate of from 2½ to 2½ knots.

The hills on Roka tō vary little in elevation, and, being almost devoid of vegetation, this island is readily identified from the other two large islands of the group. The coasts are indented by numerous bays; there are two large bays on the south-eastern side, but they are entirely occupied by mud banks which dry.

Rōroku tō lies on the northern side of the western entrance to Datō suidō, and is connected to the south-western end of Roka tō by a sandbank which dries; this islet has a sharp summit 458 feet (139m6) high, and is very conspicuous.

Shoan tō.—Dangers.—Shoan tō, the eastern of the three large islands of Shoan guntō, is divided into two parts, north and south, by a low, narrow neck. Kakaku san (Kahannyon), the summit of the island, is situated at the northern end of the southern part and is 1,193 feet (363m6) high; Fukyō san is a conspicuous rocky peak.

Charts 3365, 104, 3480.

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Chart 1558, plan of Shoan kō.

740 feet (225^{m}5) high, situated about one mile southward of Kakaku san. Seihen hō, the highest peak in the northern part, is situated near the eastern end, and is a regular cone 1,107 feet (337^{m}4) high.

Chinsanri ho, on the southern side of Shoan tō, affords sheltered anchorage from all except southerly winds, and out of the strength of the tidal streams; there are depths of about 3¾ fathoms (6^{m}9), mud, in about the middle of the bay. Reimōtai gan, 23 feet (7^{m}0) high, lies about one cable off the eastern entrance point of the bay, and Rō sho lies close off the western entrance point.

Fuji kaku is the eastern extremity of a peninsula which extends from the east coast of Shoan tō, and is a cliffy point; a reef, which dries one foot (0^{m}3), lies nearly 2 cables eastward of this point. Ibuki shō (*Lat. 34° 07′ N., Long. 126° 41′ E.*), a rock with a depth of 4 feet (1^{m}2) over it, lies about 1¼ miles southward of Fuji kaku and a quarter of a mile offshore

Seihen ho, the bay between Fuji kaku and Seihen kaku, nearly 2 miles northward, affords temporary anchorage except with easterly winds.

Tansōsho kaku is the low northern extremity of Shoan tō, and terminates southward in a shingle spit. Dai sho is a rock, 8 feet (2^{m}4) high, lying on a spit which extends about a quarter of a mile northward from Tansōsho kaku. Kakushi sho, nearly one mile northward of Dai sho, is a rock which dries 12 feet (3^{m}7).

Chart 1558.

Shoan kō.—Dangers.—Shoan kō is the narrow channel which runs in a north and south direction between Shoan tō, on the eastern side, and Hokitsu tō and Roka tō on the western side; between the shoal flats which extend from both sides there are depths of from 5 to 16 fathoms (9^{m}1 to 29^{m}3) over the greater part.

The harbour can be entered from the southward, westward, or northward. The southern entrance, between Tongan kaku, the west point of Shoan tō, and the eastern extremity of Hokitsu tō, has depths of from 5 to 10 fathoms (9^{m}1 to 18^{m}3), and the tidal streams attain a rate of from 1¾ to 2 knots. The western entrance is through Datō suidō (page 408). The northern entrance lies between Dai sho and Kyū tō, situated about 4 cables north-westward, and has a least depth of 7 fathoms (12^{m}8) in the fairway; the maximum rate of the tidal streams is about 1½ knots. Kyū tō has a dome-shaped summit, 346 feet (105^{m}5) high, and the southern side, as well as the summit, are densely wooded.

The shoal flat which extends from the western side of Shoan tō is steep-to. There are several islets on the western side of the northern part of the channel; Seki tō, the southernmost of these, lies nearly 1¼ miles northward of Shogan kaku (page 408). A rock, which dries 3 feet (0^{m}9), lies about one cable south-eastward of Seki tō, and a rock, with a depth of 3¾ fathoms (6^{m}9) over it, lies about 4 cables north-eastward of this islet. A rock, with a depth of 2¾ fathoms (5^{m}0), lies about 1¼ cables eastward of Shogan kaku.

Owing to the confined space, Shoan kō is only suitable for small vessels. There is anchorage in the middle of the harbour, in a depth of about 9 fathoms (16^{m}5), mud, with Seki tō bearing 294°, distant 4¼ cables. During winter, with strong northerly winds, this anchorage is unsafe, and it is better then to anchor in the vicinity of Reisaku tō.

Charts 3365, 104, 3480.

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Chart 1558.

Directions.—Vessels making for the southern entrance of Shoan kō from the westward will pass northward of Izumo shō (page 407) by keeping Kakaku san, the summit of Shoan tō, bearing not less than 060° and open northward of Bokusei tō; course should then be shaped to pass between Bokusei tō and Shō tō, which lies about three-quarters of a mile northward. Vessels making for the southern entrance of Shoan kō from the southward, and passing eastward of Shashi tō, should keep the summit of Kyū tō bearing not more than 009°, and open eastward of Shogan kaku (*Lat. 34° 09′ N., Long. 126° 38′ E.*), so as to pass clear eastward of Shashi tai. A mid-channel course should then be steered through the entrance; the summit of Kyū tō in line with Sotsukotō, a salient point of Shoan tō about one mile southward, bearing 004°, leads eastward of the 2¼-fathom (5^{m}0) rock off Shogan kaku and to the anchorage.

Vessels making for the northern entrance of Shoan kō should pass between Kakushi sho and Dai sho by keeping Kyūdan san, a conspicuous hill with a sharp summit, 500 feet (152^{m}4) high, situated on the eastern extremity of Roka tō, in line with the summit of Kyū tō, bearing 263°; Kakushi sho will be identified by the time the rear mark of this alignment has disappeared. When Hachō san (page 408) is in line with Sotsukotō, bearing about 205°, vessels can pass through the entrance by steering for the east point of Kakyūyō tō, an islet nearly half a mile west-south-westward of Sotsukotō, bearing 215°. When nearing Sotsukotō a more southerly course should be steered, passing eastward of the rock, with a depth of 3¾ fathoms (6^{m}9) over it, lying about 4 cables north-eastward of Seki tō.

Chart 3365.

Islands and dangers northward of Roka tō.—Ōkan tō (Craig Nicoll), the northernmost island of Shoan guntō, is separated from the northern side of Roka tō by Chōkyū suidō, a channel about 3 cables wide, and can be readily identified; from the eastward it appears as a flat ridge, terminating southward in a steep, rugged slope which ends in a cliff nearly 400 feet (121^{m}9) high.

Tatsuta shō, nearly 1½ miles eastward of Ōkan tō, is a pinnacle rock which dries one foot (0^{m}3); when the tidal streams are strong there are heavy overfalls over the rock, but at slack water it is not easily seen, and it is, therefore, extremely dangerous.

Shō-Basaku tō, an islet 71 feet (21^{m}6) high, lies about half a mile westward of Ōkan tō, and about three-quarters of a mile farther westward is Dai-Basaku tō, an island 212 feet (64^{m}6) high; a shoal, with a least depth of 4 fathoms (7^{m}3) over it, lies about 3 cables north-north-eastward of the east point of Dai-Basaku tō.

Chōkyū suidō, bounded southward by the north coast of Roka tō, and northward by Ōkan tō, Shō-Basaku tō, and Dai-Basaku tō, has depths of from 11 to 17 fathoms (20^{m}1 to 31^{m}1) in the fairway. The tidal streams set westward with the rising tide, and eastward with the falling tide; the maximum rate is 4½ knots.

Chart 1558, plan of Shoan kō

Islands and dangers westward of Roka tō.—A shoal flat extends about 3½ miles north-westward from Hokitsu tō and nearly 4 miles westward from Roka tō; there are several islands and rocks on this flat, the largest being Jō tō.

Katoku tō is an islet lying about 2 miles west-north-westward of the

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Chart 1558, plan of Shoan kō.

south-west point of Jō tō ; a rock, with a depth of 2¾ fathoms (5m0) over it, lies about 1½ miles south-westward of Katoku tō.

Gaimō gunto (Yemadori group), lying north-westward of Katoku tō, is described on page 412.

Tidal streams.—Northward and southward of Shoan gunto the tidal streams set eastward and westward, the west-going stream running from about 2 hours after low water to about 2 hours after high water, and the east-going stream from about 2 hours after high water to about 2 hours after low water ; at spring tides there is no period of slack water.

Southward of Shoan tō the west-going stream divides into two parts, one part setting northward into Shoan kō, and the other passing on both sides of Shashi tō, past the southern extremity of Hokitsu tō and then setting north-westward. The east-going stream acts in the reverse way. The maximum rate is 4½ knots.

Charts 3365, 913.

WESTERN SIDE OF KOREA.—The west coast of Korea for 150 miles northward of Kainan kaku (*Lat. 34° 18′ N., Long. 126° 31′ E.*), the south-western extremity of the Korean peninsula, is much indented by bays and inlets ; these are, however, so obstructed by sand and mud flats that, except for Gunzan (page 459) and two or three other harbours, there are no anchorages for large vessels. Numerous islands lie off this coast, either singly or in groups, but there are few good anchorages amongst them.

Chart 3365.

Kainan kaku.—Kainan kaku is situated nearly 4 miles north-north-westward of the north point of Roka tō, and has a hill 505 feet (153m9) high on it, named Shishi hō ; Bōji san, about 6 cables northward of Kainan kaku, is 548 feet (167m0) high. Both these hills are conspicuous. An islet, 39 feet (11m9) high, lies about 3 cables westward of Kainan kaku and 1½ cables offshore, and about 3 cables north-westward of this islet is Yan dō, an island 144 feet (43m9) high.

For the description of the coast eastward of Kainan kaku, *see* South and East coasts of Korea, East coast of Siberia, and Sea of Okhotsk Pilot. The coast northward of Kainan kaku is described with Baro kai on page 412.

Islands and dangers south-westward of Kainan kaku.—Light.—Chō guntō (Long island group) consists of five small islands and a few islets ; Gyoryū tō, the north-eastern and largest island of the group, lies about 2 miles westward of Kainan kaku and is 285 feet (86m9) high. A shoal, with a depth of 1¾ fathoms (3m2) over it, lies about 3 cables south-eastward of the southern extremity of Gyoryū tō, and about 3 cables eastward of the shoal is a 3½-fathom (6m4) patch. U tō, an islet 118 feet (36m0) high, lies close off the north point of Gyoryū tō, and there is a clear channel, with depths of about 15 fathoms (27m4) in the fairway, between this islet and Yan dō ; the tidal streams in this channel are strong.

A light is exhibited, at an elevation of 302 feet (92m0), from a white octagonal concrete tower, 20 feet (6m1) in height, on the summit of Gyoryū tō. A fog signal is sounded from the lighthouse.

Shō Seigen tō, 193 feet (58m8) high, lies at the western end of Chō guntō and nearly 2 miles westward of the southern extremity of

Charts 104, 3480, 1262.

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Chart 3365.

Gyoryū tō ; a 4¾-fathom (8m2) patch lies about 3 cables north-westward of Shō Seigen tō, and a 4-fathom (7m3) patch lies nearly 1½ miles northward of this island. Dai Seigen tō, 220 feet (67m1) high, lies close southward of Shō Seigen tō. Keitei tō are two rocky islets lying close together, and the western and higher of the two is 98 feet (29m9) high and lies nearly half a mile south-westward of Dai Seigen tō. Chōkyū tō and Shō Chōkyū tō are the middle islands of the group ; the latter is the northern island of the two and is wooded. A rock, with a depth of 5 fathoms (9m1) over it, lies about half a mile southward of Chōkyū tō.

Gaimō guntō (Yemadori group), lying south-westward of Chō guntō, consists of three small islands and several rocks. Chikukutsu tō (Teipan tō), the easternmost island of this group, lies with its northern extremity about 3½ miles south-westward of Gyoryū tō ; Mongyo hokutō (Kunmune Semu), a rock 134 feet (40m8) high, lies nearly 4 cables south-eastward of Chikukutsu tō, and about 2 cables farther south-eastward is Mongyo nantō (Chagunmune semu), a rock 125 feet (38m1) high, covered with grass. San tō (Bluff Cliff), the middle island of the group, rises steeply to an elevation of 292 feet (89m0) at its south-western end and slopes down gradually north-eastward ; it is a good mark when seen from the south-eastward, having the appearance of a dog lying down with its head raised. A rock, 6 feet (1m8) high, lies about one cable off the north point of San tō (*Lat. 34° 14′ N., Long. 126° 25′ E.*). Gaimō tō (Katsumei tō), the westernmost island of the group, lies nearly one mile westward of San tō and rises steeply on its southern side to an elevation of 285 feet (86m9), thence sloping down gradually to its northern extremity ; Kaimon shō, a rock which dries 7 feet (2m1), lies about 3 cables westward of Gaimō tō, and Kōtatsu sho, a rock above water, lies about 3 cables north-eastward of this island. A shoal, with a least depth of 3½ fathoms (6m4), lies about one mile northward of Gaimō tō.

Baro kai.—Islets and dangers.—Light.—Baro kai (Washington gulf) is the name applied to the area bounded eastward by Gaimō guntō, Chō guntō, and the coast northward of Kainan kaku, and westward by Chin tō. At its northern end it is connected with Teitō kai (page 439) by a narrow strait named Meiyō to. Both shores of Baro kai are bordered by mud flats which partly dry, and rows of fishing stakes are placed on them. The northern part of the gulf is narrow and there are several shoals, but a least depth of 5 fathoms (9m1) can be carried throughout ; the tidal streams are strong, and it should not be entered without local knowledge.

Mitsubai (Marumei) tō is an islet in the southern part of Baro kai and lies about 2¾ miles north-westward of Gaimō tō ; a rock, 36 feet (11m0) high, lies about 2 cables south-westward of this islet. Katsumei (Karumei) tō is an islet about 2¼ miles north-north-eastward of Mitsubai tō, and a rock, 75 feet (22m9) high, lies about 2 cables westward of it ; a 2¼-fathom (4m1) patch lies about 3 cables northward of this rock, and a 5-fathom (9m1) patch lies about one mile northwestward of the same rock. Man sho, a rock 14 feet (4m3) high, lies about 1½ miles eastward of Katsumei tō. Shishi (Kuja) tō is a group of three islets, the southern of which lies about 3 miles north-westward of Katsumei tō ; a rock, 49 feet (14m9) high, lies about 2 cables westward of the north-west point of the southern islet.

Charts 104, 3480, 1262.

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Chart 3365.

The eastern side of Baro kai, between Kainan kaku (page 411) and a point about 8½ miles northward, is indented by two bays, but the southern of these is very shallow, and the northern is almost entirely occupied by a mud flat which dries. Obutsu tō, an island 425 feet (129^{m}5) high, lies off the northern entrance point of the southern bay, and on the northern side of the strait between them is the fishing harbour and village of Oranchin; the village lies at the head of a small cove, which dries; a breakwater extends from the western entrance point, and two breakwaters extend from the eastern entrance point of the cove. There is a stone pier at the village, but it dries alongside at low water. A light is exhibited from a white concrete structure on the head of the western breakwater. A reef, which dries, lies nearly in the middle of the eastern entrance to the strait between Obutsu tō and Oranchin, and is marked by two white concrete pillars surmounted by triangles.

Kinko rettō (Chimu somu) is a group of islands lying on a bank, with depths of less than 3 fathoms (5^{m}5), which extends about 1½ miles from the south-east coast of Chin tō; Kinko tō, the northernmost island of the group, is about 300 feet (91^{m}4) high and lies about 6 miles north-westward of Oranchin. There are depths of less than 5 fathoms (9^{m}1) up to a distance of about 2½ miles south-eastward and 3¼ miles southward of Kinko rettō.

Sanba (Gabaro) tō is a group of five islands, on which are a few trees, lying on the eastern side of the southern end of the narrow part of Baro kai; Ka-ba tō, the south-eastern island of the group, is 193 feet (58^{m}8) high, and lies about 5 miles north-north-westward of Oranchin. A rock, with a depth of 2¼ fathoms (4^{m}1) over it, lies about 6 cables westward of Ka-ba tō, and a rock, with a depth of 4 fathoms (7^{m}3), lies nearly one mile west-south-westward from the same island. Kantō san, a rocky hill, 581 feet (177^{m}1) high, situated on the coast eastward of the north-western island of the group, is a useful landmark when entering Baro kai from the northward. The tidal streams run northward and southward near Sanba tō, with a maximum rate of from 2 to 2½ knots.

About 1¾ miles northward of Kantō san is the southern entrance point of a large bay, which is, however, almost entirely occupied by flats which dry; it is entered by a narrow passage which divides into two channels about 1½ miles within the entrance, one running north-eastward, and the other in an easterly direction to Kaisō ri, a village on the southern shore about 4 miles eastward of the southern entrance point of the bay.

Meiyō to.—Meiyō to (Megunyaguto), the northern entrance to Baro kai, is only 1¾ cables wide at its narrowest part and the tidal streams are very strong; it derives its name, which means "Strait of crying waters", from the sound of the water surging over a rock, with a depth of 6 feet (1^{m}8) over it, lying about half a cable off the north-eastern side of the narrowest part. There are several conspicuous hills on both sides of Baro kai, which are useful landmarks for the navigation of Meiyō to: Sensatsu san (Needle hill), situated about 3 miles westward of the east point of Chin tō, is 1,586 feet (483^{m}4) high and is the highest peak on that island, but it is difficult to identify except from the northward; Chikusai san, a peak about 6 cables north-eastward of Sensatsu san (*Lat. 34° 29′ N., Long. 126° 19′ E.*), is 1,376 feet (419^{m}0) high and is conspicuous from the northward;

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Kinkotsu san is a sharp rocky peak, 658 feet (200^{m}5) high, situated about 4½ miles north-north-westward of Sensatsu san, and is conspicuous from all sides; Tō gan, a rocky hill 395 feet (120^{m}4) high, shaped like a helmet, is situated nearly 1¼ miles north-westward of Kinkotsu san; Bōkin san, situated just within the south-western shore of the narrowest part of Meiyō to, is a conical hill 369 feet (112^{m}5) high and plainly indicates the position of the strait from a distance.

A conical hill, 192 feet (58^{m}5) high, on the western side of Jō-ba tō, the second island from the northward of Sanba tō, is a useful mark for vessels proceeding northward through the gulf. A conical hill, 215 feet (65^{m}5) high, with a solitary pine on its summit, situated on the south-eastern extremity of Choi tō, an island about 3 miles northward of Kantō san, is conspicuous. Sei san, on the eastern side of the south-eastern entrance to Meiyō to and nearly 5 miles northward of Jō-ba tō, is 284 feet (86^{m}6) high; alum is mined on the northern side of this hill and is brought down by a light railway to some black godowns and a stone pier on its south-western side.

Gyokumai san, about 2½ miles north-north-westward of Sei san, is a conspicuous, reddish, rounded hill, 572 feet (174^{m}3) high; alum is also mined on its summit and is brought down to a stone pier on the coast south-westward of the hill.

Usuiei (Chejin) is situated on the northern side of the western entrance to Meiyō to, and had a population of 2,475 in 1929. Landing can be effected at a stone bund which fronts the village and nearly dries. There is a telegraph office in the village, and there is steamer communication with Mokuho.

Lights.—A light is exhibited, at an elevation of 37 feet (11^{m}3), from a red iron pillar on a concrete base situated on a rock, which dries, lying on the northern side of the fairway and nearly half a mile north-north-eastward of Harris point; this point is situated on the southern side of the fairway and about 4½ miles northward of Sensatsu san.

A light is exhibited, at an elevation of 54 feet (16^{m}5), from a white circular brick tower, 23 feet (7^{m}0) in height, situated on a point at the northern end of Chin tō and on the south-western side of the narrowest part of Meiyō to.

Islets and dangers.—Ryū gan is a conspicuous rock 23 feet (7^{m}0) high, white from birds' droppings, situated about 4 cables southward of Sei san and nearly 2 cables offshore. A rock, which dries, lies about half a mile west-north-westward of Ryū gan and nearly 1¼ cables offshore. A shoal, with a least depth of 4¼ fathoms (7^{m}8) over it, lies about 1¼ miles west-north-westward of Ryū gan and nearly in the middle of the strait.

An islet, 234 feet (71^{m}3) high, lies about three-quarters of a mile south-eastward of Harris point and 2 cables offshore. A 4¾-fathom (8^{m}7) patch lies about 4 cables eastward of Harris point. An islet, 53 feet (16^{m}2) high, lies about three-quarters of a mile eastward of Harris point, and shoal water extends about 2 cables southward from this islet; some islets and reefs lie between this islet and the north-eastern shore of the strait.

A shoal, with a least depth of 4 fathoms (7^{m}3) over it, lies about half a mile north-westward of Harris point, and a rock, with a depth of 1¾ fathoms (3^{m}2) over it, lies nearly 7 cables westward of this point.

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An island, 195 feet (59m4) high, lies with its south-western extremity about one mile north-westward of Harris point and on the northern side of the fairway; an islet, 116 feet (35m4) high, lies about 2 cables south-westward of the above island, and another islet, 100 feet (30m5) high, lies close of the west coast of the latter. The fairway through the strait lies between the island and the 116-foot (35m4) islet south-westward of it.

Tidal streams.—The tidal streams in Meiyō to set north-westward with the rising tide, and south-eastward with the falling tide; the former runs from about one hour after low water till about one hour after high water at Jō-ba tō, and the latter runs for the remainder of the time. Off Chin tō lighthouse (*Lat. 34° 34′ N., Long. 126° 18′ E.*) the tidal streams attain a rate of 7 knots at neap tides and 9 knots at spring tides, but a short distance within the strait these rates increase to 9 and 11 knots, respectively.

In the south-eastern entrance to Meiyō to high and low water occur about 40 minutes later than at Jō-ba tō, and in the north-western entrance about 50 minutes earlier.

Cables.—A submarine telegraph cable crosses the strait in a north-easterly direction from close southward of Harris point; each landing place is marked by two pairs of beacons, and anchorage is prohibited within the alignments of each pair.

An overhead power cable crosses Meiyō to, at an elevation of 174 feet (53m0), in a north-easterly direction from a position near Chin tō lighthouse.

Chin tō.—Chin tō is a hilly island; Joki san (Lagraviere peak), in the southern part of the island, is a rocky peak conspicuous from all sides; Seibō san is a conical, wooded hill, 576 feet (175m6) high, situated on the south-western extremity of the island, 4¾ miles west-south-westward of Joki san, and is a useful mark for vessels passing through Chōchiku suidō; near the coast about 1½ miles eastward of Seibō san is a rocky peak, 651 feet (198m4) high, the southern side of which is steep and which appears like a horn when seen from the eastward or westward.

Kō tō is a wooded island, 564 feet (171m9) high, connected to the south-east coast of Chin tō by a mud bank which dries; a rock, with a depth of 1¾ fathoms (3m2) over it, lies about one mile westward of the south point of Kō tō. Chōtō kai is a bay on the south-west coast of Chin tō, entered close northward of the point on which is Seibō san, but it is almost entirely occupied by mud flats which dry; three islets lie close off its south-eastern entrance point. About midway along the north-west coast of Chin tō and about 6½ miles west-south-westward of Chin tō light (page 414) is the entrance to Sōho kō, an inlet which penetrates more than half-way through the island in a southerly direction, although the greater part of it dries; Chintō or Yūnai, the principal village in Chin tō, is situated at the head of an eastern arm, entered about 2 miles within the entrance of this inlet, and had a population of 6,331 in 1935.

ISLANDS AND CHANNELS SOUTH-WESTWARD OF CHIN TŌ.—Chōchiku suidō.—Chōchiku suidō (Chanjiku channel), the first of the principal channels between the various groups of islands lying south-westward of Chin tō, leads into the Teitō kai (page 439), and is the best approach to Mokuho kō (page 448) from the

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southward; this channel is bounded north-eastward by the south-west coast of Chin tō, and south-westward by Dokukyo guntō, Kachō tō, and Jōchō tō.

Dokukyo guntō (Tokko group) is a group of islands lying in the south-eastern part of Chōchiku suidō; Dokukyo (Tokko) tō, the largest of the group, lies about 6¼ miles south-south-eastward of Seibō san, and has a conspicuous and somewhat pointed summit 596 feet (181m7) high. Dankō tō, 434 feet (132m3) high, lies close off the southern extremity of Dokukyo tō and is connected to it by a rocky ridge which dries; three conspicuous rocks, 182 feet (55m5) high, lie close off the east point of Dankō tō. Karumeki tō lies close westward of the northern extremity of Dokukyo tō, and is a thickly wooded island 274 feet (83m5) high; Ben (Un) tō, a conspicuous pointed rock 150 feet (45m7) high, lies about a quarter of a mile north-westward of Karumeki tō. Hitsu (Pia) tō, about 1¼ miles westward of the northern extremity of Dokukyo tō, has a flat summit, 400 feet (121m9) high, with some pine trees on it; a thickly wooded islet, 159 feet (48m5) high, lies close off the southern extremity of Hitsu tō and is connected to it by a reef, and about 3 cables south-westward of this islet is Tō sho, a rock 48 feet (14m6) high. Ketsu tō, 307 feet (93m6) high, lies nearly one mile south-westward of Dankō tō and has some houses on its northern side; a rock, which dries 6 feet (1m8), lies about 1¼ cables south-westward of Ketsu tō. Saishū tō, an islet 304 feet (31m7) high, lies about 4 cables eastward of Ketsu tō, and between them is a pointed rock 19 feet (5m8) high. An islet, covered with grass and 200 feet (61m0) high, lies close northward of Ketsu tō, and between them is Kai-i sho, a pointed rock 94 feet (28m7) high. Karan sho, a rock 26 feet (7m9) high, lies about midway between Ketsu tō and Dankō tō, and close north-westward of this rock is a rock which dries 10 feet (3m0). Rōdaiki (Natsuteki) tō is a wooded island lying about 4 cables westward of Ketsu tō; Katan tō, a rock 100 feet (30m5) high, lies about 2 cables south-westward of Rōdaiki tō. A rock, 7 feet (2m1) high, lies about three-quarters of a mile north-westward of Rōdaiki tō, and nearly one mile eastward of this rock is another rock 14 feet (4m3) high.

Kachō (Hacho) tō lies with its south-eastern extremity about 2½ miles west-north-westward of Hitsu tō, and there are several villages on it; it is the largest island of the group next westward of Dokukyo guntō and lies on the south-western side of Chōchiku suidō Tondai san (*Lat. 34° 17′ N., Long. 126° 03′ E.*), the summit of the island, is situated in the south-western part, about 3 miles westward of the south-eastern extremity of the island, and is a fairly conspciuous sharp peak, 891 feet (271m6) high; a ridge runs westward from Tondai san, and terminates in a conspicuous, sharp, rocky crag. Shinken san, a rocky peak 756 feet (230m4) high, situated in about the middle of the northern side of the island and about one mile east-north-eastward of Tondai san, is very conspicuous from the northward. Chikukō tō is a rocky island, 521 feet (158m8) high, lying close off the south-east point of Kachō tō and connected to it by a shoal ridge; there is a village at the head of a bay on the northern side of this island, and small vessels with local knowledge can obtain sheltered anchorage here with southerly winds. Tanshū sho, a rock 34 feet (10m4) high, lies about 3 cables south-eastward of Chikukō tō. Two islets lie about

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three-quarters of a mile north-eastward and eastward, respectively, of the north-east point of Chikukō tō; Kokin tō, the southern of the two is 198 feet (60m3) high, and Kōdai tō, the northern, is 110 feet (33m5) high. Koku sho, a black rock 41 feet (12m5) high, lies about three-quarters of a mile south-eastward of the north-east point of Kachō tō, and close eastward of this rock is a rock which dries 10 feet (3m0).

Jōchō (Sancha) tō is separated from the northern side of Kachō tō by Chōtō suidō, which is too narrow in places to be used except by small vessels with local knowledge. Tondai san, the summit of the island, is a sharp peak, 730 feet (222m5) high, situated near the western end, and is conspicuous from the westward; Daihō san and Shōhō san, 405 feet (123m4) and 244 feet (74m4) high, respectively, situated close together in the middle of the north-east coast and about 1¼ miles north-westward of the eastern extremity of the island, are useful landmarks for vessels passing through Chōchiku suidō. There are four indentations on the southern side of the island, but they are mostly occupied by mud flats which dry. The eastern extremity of Jōchō tō is a promontory 224 feet (68m3) high.

Gyoku tō is separated from the north point of Jōchō tō by a narrow channel only available for boats, and is divided into two parts by a narrow neck of land; the eastern side of the island is steep-to. Jiya tō, an islet covered with pine trees, lies close off the western side of the north point of Jōchō tō, and about 4 cables north-eastward of this point is a black rock, 33 feet (10m1) high, named Gomi tō.

The islands off the north-western entrance to Chōchiku suidō are described on page 438.

Light.—Fog signal.—A light is exhibited, at an elevation of 152 feet (46m3), from a white circular concrete tower, 40 feet (12m2) in height, situated on the north-east point of Kachō tō.

A fog signal is sounded from the lighthouse.

Islands and dangers in Chōchiku suidō.—Butsumu tō, the easternmost island in Chōchiku suidō, lies about 4 miles eastward of the north-east point of Kachō tō and has a flat summit, 108 feet (32m9) high. Shishi (Sasha) tō lies about half a mile westward of Butsumu tō, and a rock, which dries 2 feet (0m6), lies about 3 cables off its southern side; Shotō sho, a rock 37 feet (11m3) high, lies close off its north-west point, and a rock, with a depth of 5½ fathoms (10m1) over it, lies about 6 cables westward of the same point.

Kitsuba tō (*Lat. 34° 20′ N., Long. 126° 07′ E.*), about 1¼ miles westward of Shishi tō, is 221 feet (67m4) high and thickly covered with scrub; a bank, with depths of less than 10 fathoms (18m3), extends about 4 cables north-westward and 2 cables southward from this island. An islet, 47 feet (14m3) high, lies about 3 cables southward of Kitsuba tō, and about a quarter of a mile eastward of this islet is Kankan sho, an islet 77 feet (23m5) high, with a rock, which dries, between.

Chōchiku (Chanjiku) tō lies with its southern extremity about three-quarters of a mile north-westward of Kitsuba tō, and has steep, rocky coasts. A bank, with a least depth of 9 fathoms (16m5) over it, lies nearly one mile westward of the northern extremity of Chōchiku tō, and a similar bank lies about one mile northward of this island.

Tidal streams.—The tidal streams in Chōchiku suidō run north-

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westward from about 1h. 20m. after low water at Kachō tō till about 1h. 20m. after high water, and south-eastward for the remainder of the time; the maximum rate is 7 knots.

In the channel westward of Dokukyo guntō the tidal streams set north-north-westward with the rising tide and south-south-eastward with the falling tide, the directions changing about one hour after high and low water at Kachō tō; the maximum rate is 2½ knots.

In Chōtō suidō the west-going stream runs from about one hour after low water at Kachō tō until about 5 hours after the same low water; the east-going stream runs from about 5 hours after low water at Kachō tō till about one hour after the next low water. The maximum rate is 2 knots.

Abnormal magnetic variation.—In 1935 abnormal magnetic variation was reported about 4 miles southward of Dokukyo guntō.

Islands and dangers southward of Kachō tō.—Kanbai (Porima) tō lies with its northern extremity about 1½ miles south-south-westward of the south point of Kachō tō (page 416), and its summit is a sharp peak, 727 feet (221m6) high, conspicuous from all directions; near the southern extremity of the island is a saddle-shaped hill, like the back of a camel, 556 feet (169m5) high, and half way between this hill and the south point of the island is a cleft or scar, which has the appearance of a waterfall when seen from the westward.

Kyō sho, an islet 54 feet (16m5) high, lies close off the south point of Kanbai tō. Keitei tō are two islets lying close together and connected to each other by a shoal ridge; the northern lies about 2 cables southward of the south-eastern point of Kanbai tō and is 100 feet (30m5) high, and the southern is 126 feet (38m4) high.

Kyokuto tō, an islet 130 feet (39m6) high, lies nearly 1½ miles eastward of the south-eastern point of Kanbai tō. Nanetsu shō is a pinnacle rock, with a depth of 1½ fathoms (2m3) over it, lying about half a mile southward of Kyokuto tō, and about 1½ cables westward of this rock is a rock with a depth of 2¾ fathoms (5m0); the summit of Tō Kyoji (Togocha) tō, an island about 3½ miles westward of Kanbai tō, in line with the southern Keitei tō, bearing about 279°, leads about 3 cables southward of Nanetsu shō. A shoal, with a least depth of 4½ fathoms (7m8), lies about 4 cables northward of Kyokuto tō.

Shini tō (*Lat. 34° 14′ N., Long. 126° 05′ E.*), 261 feet (79m5) high, lies nearly half a mile north-westward of Kyokuto tō, and about 3 cables farther north-westward is Kō tō, an islet 254 feet (77m4) high, connected to the east point of Kanbai tō by a reef. Seitō tō lies about 4 cables north-north-eastward of Shini tō, and rises to an elevation of 448 feet (136m5) on its eastern side; a reef extends about a quarter of a mile from the western side of Seitō tō, and on this reef is an islet 80 feet (24m4) high. Moku sho, a rock 35 feet (10m7) high, with a rock awash close off its north-western side, lies nearly half a mile eastward of Seitō tō.

Hogan tō, an islet 166 feet (50m6) high, with a conspicuous rock on its summit, lies close off the north-east point of Kanbai tō and is connected to it by a reef; a reef, with a depth of 2½ fathoms (4m1) over it, lies about 3 cables eastward of Hogan tō. Kakukitsu tō, 386 feet (117m6) high, lies close off the north point of Kanbai tō and is connected to it by a reef; a reef, with a depth of 2½ fathoms (4m1)

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over it, lies about 3 cables eastward of Hogan tō. Suigyoku tō, 238 feet (72m5) high, lies about 6 cables northward of Kakukitsu tō and close off the western entrance point of a bay in the middle of the south coast of Kachō tō.

Chikukō suidō.—Chikukō suidō is the channel bounded northward by Chikukō tō (page 416) and the eastern part of the south coast of Kacho tō, and southward by Seitō tō and Kanbai tō; as it is deep and practically free from dangers, it affords a good approach to Chōtō hō from the eastward.

The tidal streams in Chikukō suidō run north-westward from about one hour after low water till about one hour after high water at Kachō tō, and south-eastward for the remainder of the time; the maximum rate is 5 knots.

Islands and dangers westward of Kanbai tō.—Kyoba tō (South island) lies about 1½ miles westward of the western extremity of Kanbai tō, and is covered with scrub. Shō Kyoba tō, a rock 46 feet (14m0) high, lies about half a mile north-north-eastward of Kyoba tō, and about one cable northward of this rock is a rock which dries 7 feet (2m1).

Daiba (Teimaa) tō is an island lying with its south-east point nearly one mile north-north-eastward of Shō Kyoba tō; its summit is a sharp peak, 591 feet (180m1) high, rising steeply from the west coast. An islet lies close off the south-east point of Daiba tō, and two islets lie close off the north-east point.

Jōgyo sho, a rock 72 feet (21m9) high, lies about three-quarters of a mile eastward of the south-east point of Daiba tō; shoal water extends for about one cable arround this rock, and there are depths of less than 5 fathoms (9m1) for half a mile southward and a quarter of a mile south-westward.

Kaisui sho is a group of rocks, the highest of which, 22 feet (6m7) high, lies about three-quarters of a mile north-north-eastward of Jōgyo sho; there is foul ground around these rocks, and they should be given a berth of fully 2 cables. Northward of Kaisui sho the tidal streams set westward with the rising tide, and eastward with the falling tide, turning about one hour after high and low water at Kachō tō, and attaining a rate of 4½ knots.

Chōtō ho.—Dangers.—Chōtō ho (Murray sound) is the sound enclosed between Kacho tō and Jōchō tō on the north-eastern side, and Kanbai tō, Daiba tō and the islands northward of the latter, on the south-western side; there are several places within it where vessels with local knowledge can obtain anchorage.

Bō tō (Seal island) lies about half a mile northward of the north point of Daiba tō, and has two summits, the western 241 feet (73m5) high and the eastern 202 feet (61m6) high; foul ground extends about 3 cables from its western extremity. Shō Bō tō, an islet 123 feet (37m5) high, lies about 2 cables eastward of Bō tō; Koku sho, a black rock 16 feet (4m9) high, lies about a quarter of a mile south-eastward of Shō Bō tō.

Shōba tō (Swinger island) lies about half a mile north-westward of Bō tō; foul ground, with depths of less than 3 fathoms (5m5), extends nearly 2 cables from its south-eastern side. Poruchon tō, a double islet 41 feet (12m5) high, lies on a reef which extends about 2 cables from the western side of Shōba tō. Shinmoku shō, a steep-to reef with

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a depth of 1½ fathoms (2ᵐ7) over it, lies about three-quarters of a mile south-westward of Poruchon tō.

Chō tō (*Lat. 34° 18′ N., Long. 126° 00′ E.*), about 6 cables east-north-eastward of the north-east point of Shōba tō, is a wooded islet with a rounded summit, 64 feet (19ᵐ5) high. Kei tō, nearly half a mile north-westward of Chō tō, is an islet 68 feet (20ᵐ7) high.

Rahai tō lies close off the north-west point of Kachō tō. Shō Rahai tō, an islet 57 feet (17ᵐ4) high, covered with pine trees, lies about a quarter of a mile southward of Rahai tō; Tōko tō, a small islet 61 feet (18ᵐ6) high, lies about 1½ cables south-eastward of the south-east point of Rahai tō, and on the outer edge of the mud flat which extends from that island.

Kansa tō (Wheeler island) lies about a quarter of a mile northward of Shōba tō, and has a sharp peak 570 feet (173ᵐ7) high; the passage between these two islands is not even practicable for boats. Shū tō (North island) lies close northward of Kansa tō, and is connected to it by a shoal ridge; it has a rounded summit 464 feet (141ᵐ4) high and is uninhabited. Sanshi sho, a rock 57 feet (17ᵐ4) high, lies about a quarter of a mile north-eastward of the north-east point of Shū tō. Shinmoku tō, close westward of Kansa tō, is a thickly wooded island 350 feet (106ᵐ7) high; Hoku tō, an islet 54 feet (16ᵐ5) high, lies about a quarter of a mile southward of Shinmoku tō. Kaboku tō, about a quarter of a mile westward of Shinmoku tō, has a thickly wooded summit 425 feet (129ᵐ5) high; Katsu tō, a reddish islet 133 feet (40ᵐ5) high, lies close off the south point of Kaboku tō, and is connected to it by a reef. A rock, with a depth of 4½ fathoms (8ᵐ2) over it, lies about 2 cables southward of Katsu tō; a reef, with a depth of one foot over it, lies in the middle of the southern entrance to the channel between Kaboku tō and Shinmoku tō. Shokura tō, a conspicuous rock 156 feet (47ᵐ5) high, lies about 3 cables northward of Kaboku tō, and close eastward of this rock is a rock 8 feet (2ᵐ4) high.

Soku tō, about three-quarters of a mile northward of Shū tō, has a rounded summit 290 feet (88ᵐ4) high; foul ground, on which is a rock 31 feet (9ᵐ4) high, extends about 2 cables from its eastern end. Ryūkin tō, 394 feet (92ᵐ7) high, lies about half a mile north-eastward of Soku tō; a rock, 26 feet (7ᵐ9) high, lies close off its north-east point. Both these islands are uninhabited.

The islands and dangers westward and northward of Soku tō are described on page 438.

Kyoji suidō.—Kyoji suidō (Gocha channel) is a deep channel lying between Daiba tō (page 419) and the islands northward of it which have just been described with Chōtō ho, and Kyoji guntō. In the south-eastern entrance are Kyoba tō and Shō Kyoba tō (page 419), Kyoji guntō (Gocha islands) consists of two islands with several islets between them. Tō Kyoji tō, the south-eastern of the two islands, lies with its eastern extremity nearly 2 miles south-westward of Daiba tō, and there are several bays, available for small vessels with local knowledge, and villages along its coasts; Hoku tō (Rat island), 182 feet (55ᵐ5) high, lies about 3 cables eastward of the east point of Tō Kyoji tō. Sei Kyoji (Sogocha) tō, the north-western island, has a sharp summit, 526 feet (160ᵐ3) high, on its western side; there are several shoal bays, with villages at their heads, on the southern side of this island.

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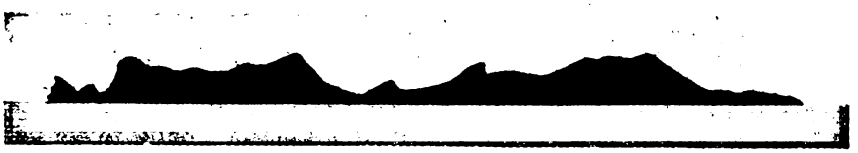
Yōkan sho (Yangan tō), nearly 3 miles north-north-westward of the north point of Sei Kyoji tō, is a very conspicuous islet. Shō Yōkan sho (Soyangan tō) is a group of rocks, the highest of which, in about the middle of the group, is 41 feet (12m5) high, and lies nearly three-quarters of a mile west-north-westward of Yōkan sho.

The tidal streams in Kyoji suidō run north-westward from about 1 h. 40 m. after low water till about 1 h. 40 m. after high water at Kachō tō, and south-eastward for the remainder of the time; the maximum rate of the former is 7 knots, and that of the latter 5 knots.

Mōkotsu suidō.—Mōkotsu suidō is a deep channel between Kyoji guntō and Mōkotsu guntō, about 2½ miles south-westward, and is used regularly by vessels.

Byōbu (Hempun) tō lies off the southern entrance to Mōkotsu suidō, with its northern extremity about 4 miles southward of Tō Kyoji tō; this island consists of two parts connected by a narrow neck of land, and is very conspicuous, with precipitous coasts. The summit of the island, situated in the northern part, is 441 feet (135m3) high, and the highest peak in the southern part is 418 feet (127m4) high.



Byōbu tō.

Mōkotsu guntō (Myangoru group) is the outermost group of the islands lying south-westward of Chin tō, and consists of three main islands, which appear as one when seen from the south-eastward. Kaku tō, the southernmost island of the group, lies nearly 4½ miles north-westward of Byōbu tō (*Lat. 34° 09′ N., Long. 125° 57′ E.*); a rock, with a depth of 4½ fathoms (8m2) over it, lies about 3 cables north-eastward of Kaku tō, and a rock, with a depth of 4½ fathoms (7m8), lies about the same distance west north-westward of this island. Mōkotsu (Myangoru) tō is the middle and largest island of the group, and Chiku tō (Chu dō), the northernmost island, is connected to it by a shoal ridge. All three islands are inhabited and are covered with grass.

Mōtoku (Bintoku) tō is a conspicuous islet lying about three-quarters of a mile eastward of the southern extremity of Mōkotsu tō.

The tidal streams in Mōkotsu suidō run north-westward from 2 hours after low water till about 2 hours after high water at Kachō tō, and south-eastward from 2 hours after high water till about 2 hours after low water at that island; the maximum rate is 6¾ knots.

Light.—Fog signal.—A light is exhibited, at an elevation of 276 feet (84m1), from a white circular concrete tower, 20 feet (6m1) in height, situated on the summit of Chiku tō.

A fog signal is sounded from the lighthouse.

Islet and danger westward of Mōkotsu guntō.—Hen sho (Salamis rock) lies about 1½ miles westward of Kaku tō and is a

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Chart 3365.

dangerous rock which dries 5 feet (1^{m}5); there is a depth of 3½ fathoms (6^{m}4) about 2 cables southward of this rock. Kan sho (West Pinnacle), nearly 1½ miles north-westward of Hen sho, is a very conspicuous pointed rock, 153 feet (46^{m}6) high.

KOKUZAN ISLANDS.—The Kokuzan islands comprise five groups of islands lying westward of the numerous islands off the south-western extremity of Korea, and between the meridians of 125° E. and 125° 30′ E.; Shō Kokuzan tō (Ross island), the southernmost of these islands, lies about 37 miles west-south-westward of Chiku tō. Daikokuzan guntō (Mackau group) is the northernmost group of the Kokuzan islands, and Dai Kokuzan tō (Mackau island), the largest of this group, lies about 35 miles north-north-eastward of Shō Kokuzan tō.

The Kokuzan islands are rocky and infertile, some of them producing nothing but coarse grasses, but many of them are inhabited. The coasts of the various islands are more or less indented by bays, which afford anchorage for small vessels with local knowledge.

In general, the tidal streams set between north and north-north-west with the rising tide, and in the opposite direction with the falling tide. The maximum rate of the tidal streams in the channel westward of Mōkotsu guntō has been estimated at about 2½ knots, but this rate increases in the narrow channels between the various islands of each group and also off the promontories. Caution is, therefore, necessary, when approaching these islands in foggy weather.

Shō Chūkan guntō.—Dangers.—Shō Chūkan guntō (Maury islands) is the south-eastern of the Kokuzan group, and consists of a number of rocks and reefs scattered around Bansai tō, the largest island of this group, which lies about 18 miles westward of Chiku tō. *See* views facing this page.

Bansai tō is divided into two parts by a low, narrow neck of shingle, over which the sea is said to break in rough weather. The eastern portion terminates eastward in Chōgan san, a hill 474 feet (144^{m}5) high. The western portion runs in a north and south direction, terminating southward in a hill 464 feet (141^{m}4) high; Koji san (*Lat. 34° 13′ N., Long. 125° 28′ E.*), the summit of the island, is situated at the northern end and is a sharp peak, 602 feet (183^{m}5) high, with some groups of trees on its southern side, whilst the northern side is precipitous. The coast is precipitous in many places, but landing can be effected on the northern side. There is a small village on the western side of the island, and two bare, rocky islets, 215 and 136 feet (65^{m}5 and 41^{m}4) high, respectively, lie close off this coast; a group of rocks lies close off the east point of the island. Small craft with local knowledge can obtain anchorage, in a depth of about 5 fathoms (9^{m}1), in the middle of the bay on the northern side of the narrow neck of shingle; this anchorage affords shelter with south-westerly winds, but caution must be exercised when approaching, as the tidal streams are strong, and Korei sho, consisting of two reefs which dry, lies off the entrance to this bay.

Kiku tō, a precipitous islet 325 feet (99^{m}1) high, with a few stunted trees on it, lies about 3 cables eastward of the eastern extremity of Bansai tō; two rocks lie close off the south point of this islet, and the outer one is 60 feet (18^{m}3) high and conspicuous.

Charts 104, 3480, 1262.

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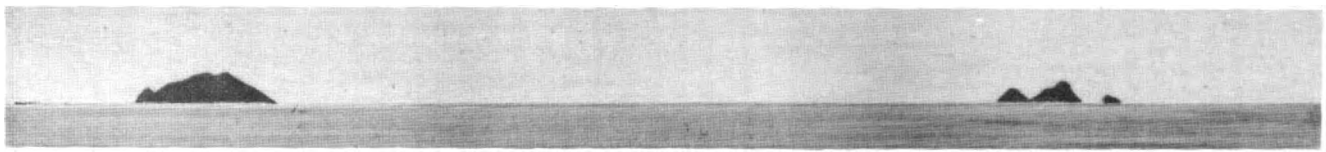
To face page 422.

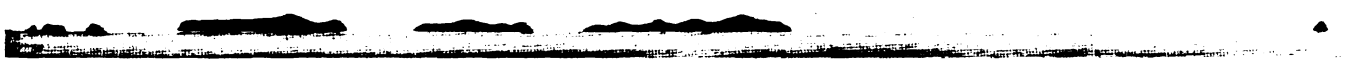
Santai tō. *Bansai tō, bearing 334°, 20 miles.* *Kiku tō.*

Shō Chukan guntō from south-south-eastward.



Shō Kokuzan tō, bearing 288°, 32 miles. *Shō Chukan guntō, bearing 322°.*

Shō Chukan guntō and Shō Kokuzan tō.



Kobuhitsu tō. *Jotai tō.* *Chutai tō, summit bearing 088°, 10.7 m.* *Jōkō san.* *Kan sho, bearing 124°, 10.3 m.*

Santai tō from westward.

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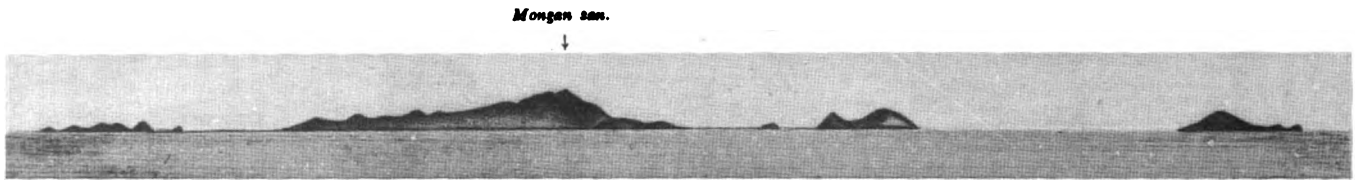
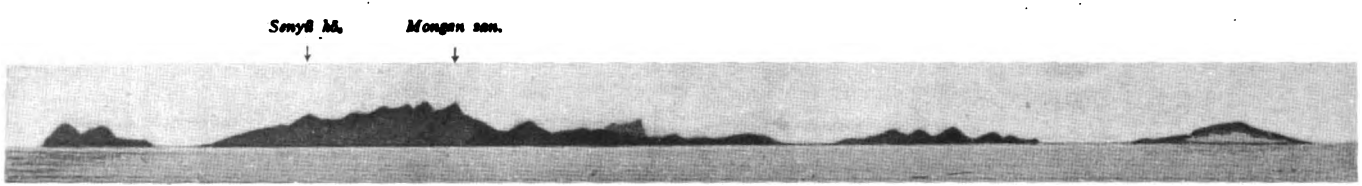


Daikokuzan guntō from northward.



Daikokuzan guntō from north-eastward.

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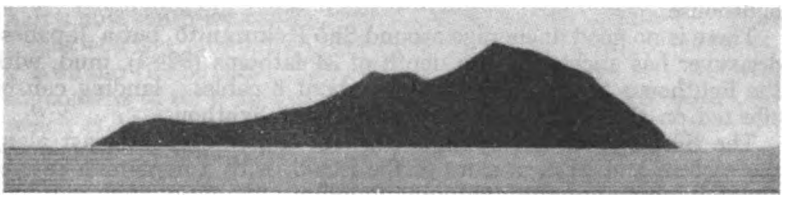
Chart 3365.

Kan sho consists of three bare, dark brown, precipitous rocks; Koku tō, the southernmost and highest rock, is 102 feet (31m1) high and lies about three-quarters of a mile northward of Kiku tō; Sai sho, the middle rock, is 98 feet (29m9) high and lies about half a mile northward of Koku tō; Kan sho, the northernmost of the three, and about the same distance farther northward, is 45 feet (13m7) high, and some rocks above water lie within 2 cables of its eastern side.

Haku sho is a bare rock, 71 feet (21m6) high, lying nearly one mile northward of the northern extremity of Bansai tō.

Shō Kokuzan tō.—Shō Kokuzan tō (Ross island) lies with its south-eastern extremity about 18½ miles south-westward of Bansai tō; its coasts are precipitous, and the higher parts of the island are densely wooded, especially on the northern side. Tokujitsu san, the summit of the island, is a rounded peak 1,862 feet (567m5) high. *See* view facing page 422.



Summit of Shō Kokuzan tō bearing 174°, distant 20.5 miles.

Butsujō matsu, the south-eastern extremity of the island, consists of high cliffs rising to a sharp, conspicuous peak 1,065 feet (324m6) high; a reef, with a depth of less than 5 fathoms (9m1), extends a short distance south-eastward from this point. Ryoku matsu, the south-western extremity of Shō Kokuzan tō, is a rocky promontory with a conspicuous rock, 97 feet (29m6) high, lying close off it. Immediately eastward of this promontory is a bight with depths of about 20 fathoms (36m6), mud, with a shingle beach at the head; a group of rocks lies close off the eastern entrance point of this bight. Dai ri is a village lying at the foot of a hill close to this point.

Nōtō matsu is the cliffy extremity of a peninsula extending from the west coast of Shō Kokuzan tō about 2 miles north-westward of Ryoku matsu; two rocks, the inner one being 156 feet (47m5) high, lie close off this point. Kon sho consists of two rocks lying close together nearly one mile south-eastward of Nōtō matsu; the north-eastern of the two is a pillar rock 97 feet (29m6) high, and the south-western is 10 feet (3m0) high. Gai Kon sho, a rock 4 feet (1m2) high, lies about 4 cables south-westward of the latter rock. The bay on the northern side of the above peninsula is sheltered from south-easterly winds and the tidal streams are not strong; the depths are less than 11 fathoms (20m1). Kō ri is a village on the top of the cliff at the head of this bay.

Katsunairi matsu (*Lat. 34° 06′ N., Long. 125° 06′ E.*), the northern extremity of the island, is low and covered with grass; several islets and rocks lie within a distance of about 4 cables north-westward of this point, the highest, named Koku sho, being 117 feet (35m7) high. To-oku sho consists of two rocks lying close together about 6 cables

Charts 104, 3480, 1262.

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Chart 3365.

northward of Katsunairi matsu; the southern and higher of the two is 80 feet (24m4) high. Kairin sho, an islet with a double summit 215 feet (65m5) high, lies about one mile northward of Katsunairi matsu; a white rock, 64 feet (19m5) high, lies about one cable southward of this islet. Dai Kyokukitsu tō, an islet 422 feet (128m6) high, lies about 4 cables westward of Kairin sho, and a rock 7 feet (2m1) high lies close off its northern side; Shō Kyokukitsu tō lies close westward of Dai Kyokukitsu tō and is 156 feet (47m5) high.

Hinshigan matsu is a high, rocky bluff on the east coast and about 1¼ miles south-eastward of Katsunairi matsu. A small bay on the northern side of this bluff affords some shelter to vessels with local knowledge during light south-westerly winds; Daihō ri is situated at the head of this bay, but landing is difficult here owing to rocks.

Light.—Anchorage.—A light is exhibited, at an elevation of 272 feet (82m9), from a white circular brick tower, 25 feet (7m6) in height, situated on Katsunairi matsu. A fog signal is sounded from the lighthouse.

There is no good anchorage around Shō Kokuzan tō, but a Japanese destroyer has anchored, in a depth of 34 fathoms (62m2), mud, with the lighthouse bearing 080°, distant about 6 cables; landing can be effected on the coast south-westward of the lighthouse.

The tidal streams set north-north-west and south-south-east along the eastern and western sides of the island, with a maximum rate of about 2 knots.

Chart 3480.

Outlying reefs.—Hyūga shō, a pinnacle rock with a depth of 3¼ fathoms (6m9), lies about 27 miles west-south-westward of the summit of Shō Kokuzan tō; there are depths of over 10 fathoms (18m3) at a distance of half a cable all round the rock, and in general the depths in this locality are from 40 to 50 fathoms (73m2 to 91m4) over a fairly level mud bottom, but about one mile north-westward of the rock there is a depth of 14 fathoms (25m6), rock.

Chart 3365.

Trawlers have reported losing their nets on a submerged rock about 10 miles northward of the lighthouse on Shō Kokuzan tō.

Santai tō.—Santai tō (Hydrographer group) is a group of three islands and three islets, the southernmost of which, named Katai tō, lies nearly 20 miles north-north-eastward of the northern extremity of Shō Kokuzan tō. These islands are very infertile, and the inhabitants depend chiefly on fishing for their subsistence. *See* view facing page 422.

With the rising tide the tidal stream sets northward along the eastern and western sides of the group, and in the opposite direction with the falling tide. Between the islands the tidal stream during the rising tide usually sets eastward in the southern parts of the group and north-westward in the northern part; the reverse occurs with the falling tide.

Jōkō san, the summit of Katai tō, is situated in the south-western part of the island and is 476 feet (145m1) high, and there is a hill 468 feet (142m6) high, named Daiji, in the south-eastern part. The south and west coasts of Katai tō are cliffy. Katsubei matsu, the south-western extremity of the island, is formed by a spur from Jōkō san, and terminates in a high cliff; a rock, which dries 6 feet (1m8), lies

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Chart 3365.

close off this point. There is a small bay on the eastern side of Katsubei matsu, but heavy seas run into it with southerly winds. Butsujōri matsu, the north-west point of the island, is the cliffy extremity of a narrow tongue of land. Santō matsu (*Lat. 34° 24′ N., Long. 125° 18′ E.*), nearly one mile south-eastward of Butsujōri matsu, is the extremity of a tongue of land extending in a northerly direction from the north coast of Katai tō. Between these two points is a bay, with depths of from 5 to 13 fathoms (9^{m}1 to 23^{m}8), which affords shelter to small vessels with local knowledge from all except northerly winds; there are two white sandy beaches at the head of this bay, and a village lies between the hills. Mō sho (Patch rock) is a bare rock 71 feet (21^{m}6) high, with deep water around, lying about half a mile northward of Santō matsu; it is very conspicuous, and strata of white quartz on its southern side make it appear like a boat under sail when seen from the eastward; Nōtō sho, a rock above water, lies close off its eastern side. Rōin sho, a rock 15 feet (4^{m}6) high, lies about half a mile south-westward of Mō sho and 1½ cables offshore. Tara tō, a rock 153 feet (46^{m}6) high, lies close off the east point of Katai tō.

Kan sho (Reille rock), about 4½ miles south-south-westward of Katai tō, consists of three steep-to pinnacle rocks, the eastern and highest of which is 180 feet (54^{m}9) high; the western rock is 97 feet (29^{m}6) high, and the middle one is much lower.

Kō sho (Havergal rock) is a flat rock, which dries one foot (0^{m}3), lying about 1¾ miles south-westward of Butsujōri matsu; when the tidal streams are strong, or with a sea running, there are heavy and confused tide rips over this rock, but at times no ripples are to be seen at all. Ben sho in line with the north-western extremity of Kokukitsu tō, the northernmost islet of Santai tō, bearing about 035°, leads nearly one mile north-westward of Kō sho, and Mō sho in line with Butsujōri matsu, bearing about 088°, leads nearly the same distance northward of this rock.

Chutai tō lies with its southern extremity nearly one mile northward of Butsujōri matsu, and rises to an elevation of 438 feet (133^{m}5) in about the centre. Except for a sandy beach on the north-eastern side, where there is a village, the coasts consist of cliffs.

Jōtai tō, a grassy island 517 feet (157^{m}6) high, is separated from the northern extremity of Chutai tō by a channel about a quarter of a mile wide, in which, however, is a reef with a depth of less than 3 fathoms (5^{m}5). There is a pebble beach, with a village on the top of the cliff behind, on the southern side of Jōtai tō; otherwise the coasts are cliffy, and are fringed by reefs in many places.

Daikaikai tō consists of two rocks, connected to each other by a pebble beach, lying about 4 cables north-eastward of the northern extremity of Jōtai tō and connected to it by a rocky ridge with a depth of about 2½ fathoms (5^{m}0) over it; the north-western rock is 166 feet (50^{m}6) high and there are a few stunted trees on it.

Gai tō, 323 feet (98^{m}4) high, lies about a quarter of a mile northward of Daikaikai tō and is connected to it by a ridge of rocks; this islet has precipitous sides and there is a group of low trees on its summit.

Kokukitsu tō (*Lat. 34° 28′ N., Long. 125° 18′ E.*), 303 feet (92^{m}3) high, lies close off the north-east point of Gai tō and is similar to it; several rocks lie close off its north-western extremity.

Sōhatsu sho (North-west rocks) consists of three rocks which dry;

Charts 104, 3480, 1262.

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Chart 3365.

the southern of these lies nearly three-quarters of a mile north-westward of the northern extremity of Kokukitsu tō and dries 6 feet (1m8).

Ben sho (Venancourt rock), nearly 4 miles north-eastward of Kokukitsu tō, is an islet 133 feet (40m5) high, and its summit appears pointed when seen from the eastward or westward, but rounded from the northward or southward. Near Ben sho the tidal streams run northward with the rising tide, with a maximum rate of about 1½ knots, and east-south-eastward with the falling tide, with a maximum rate of 2½ knots.

Daikokuzan guntō.—This group, the most northerly of the Kokuzan islands, consists of a main island Dai Kokuzan tō (Mackau island), which lies with its southern extremity about 7 miles north-north-eastward of Ben sho, and several other islands off its eastern, western, and northern sides, as well as some islets and rocks. *See* views facing page 423.

Dai Kokuzan tō.—The northern half of this island is hilly and thickly wooded, but in the southern half the slopes are more gradual and there is some arable land. Mongan san, the summit of the island, lies in about the middle of the western side, and is 1,328 feet (404m8) high, thickly wooded, and dark in appearance; from this peak a ridge runs in a south-easterly direction, terminating in Ri san, 697 feet (212m4) high and wooded on its southern side, situated on the east coast. Senyū hō, a sharp peak 1,134 feet (345m6) high, is situated on the southern end of the island and is well wooded. Jō hō is a rocky peak, 986 feet (300m5) high, situated nearly one mile north-north-eastward of Mongan san; a sharp peak, 963 feet (293m5) high, about one cable north-westward of Jō hō, is conspicuous from the north-eastward. Setsukyūbi san, situated on the northern extremity of the island, is a rocky peak 747 feet (227m7) high and precipitous on its northern side.

Seisan matsu, the southern extremity of Dai Kokuzan tō, is cliffy. Several rocks above water lie close off the coast here, and one of them, about 2 cables westward of Seisan matsu and 48 feet (14m6) high, is conspicuous from the eastward or westward.

There are several bays on the east coast of Dai Kokuzan tō. Sari wan, the southern of these, is entered between Seisan matsu and Risan matsu, about 1½ miles north-north-eastward; its shores consist of rocks and cliffs, and, except for some reefs lying close inshore, there are no dangers. Several islets lie at the head of the bay, and within these is a small inner bay with depths of from 2 to 4 fathoms (3m9 to 7m3); the village of Sari lies at the head of this inner bay.

Senson wan, the next bay northward, is entered between Risan matsu and a point nearly one mile north-north-eastward, off which is a bare rock 71 feet (21m6) high, named Kutsu sho; a rock, 18 feet (5m5) high, lies at the head of the bay. There are depths of about 7 fathoms (12m8) in the middle of Senson wan, and shelter can be obtained from all but south-easterly winds. The hamlet of Senson is situated behind trees at the head of the bay.

Between the northern entrance point of Senson wan and a point about three-quarters of a mile northward are two small coves, Seison and Sai ho; Yō sho, an islet 81 feet (24m7) high, lies close under the headland separating them, but it is difficult to identify it. Enshō san, the summit of the cliffs on the northern side of Sai ho, is 424 feet

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Chart 3365.

(130^{m}8) high and has a conspicuous group of pine trees on it. Shō tō (*Lat. 34° 40′ N., Long. 125° 27′ E.*) is an islet 58 feet (17^{m}7) high, covered with low trees, about 4 cables northward of the northern entrance point of Sai ho and almost connected to the main island.

Eiri hantō is a comparatively low and flat peninsula forming the north-eastern extremity of Dai Kokuzan tō, and is indented by several small bays which afford shelter to small vessels with local knowledge; Daihō san, the summit of this peninsula, is a conspicuous peak 409 feet (124^{m}7) high. Ryūtō san, a conspicuous hill 360 feet (109^{m}7) high, is situated close northward of Kōkin matsu, the south-east point of the peninsula; the eastern side of this hill is a cliff. Between Shō tō and Kōkin matsu is the entrance to a bay divided into smaller bays by a low tongue of land; the isthmus of Eiri hantō forms the head of Shinki ho, the south-western of these two bays, which is foul. Ren shō, a rock awash, which only breaks in rough weather, lies nearly midway between Shō tō and Kōkin matsu.

Chinri kō (St. John harbour) is a bay on the north coast of Dai Kokuzan tō and is the only good anchorage throughout the Kokuzan group, but it is only suitable for small vessels with local knowledge; it is sheltered from all except north-easterly winds and is free from danger except for Godō sho, two rocks which dry, lying close off the southern shore. Thick fog, not rapidly dispersed by the wind, has been experienced in May. Eizan tō (Eagle islets) consists of two grassy islets lying off the western entrance point of the bay and stretching half-way across its entrance; there are numerous rocks between these two islets and between the western islet and the coast, and they thus shelter Chinri kō from the north-westward. The northern sides of both islets are precipitous; the eastern islet is 189 feet (57^{m}6) high, and the western 205 feet (62^{m}5). A rock, which dries 11 feet (3^{m}4), lies about half a cable off the east point of the eastern islet. Numerous rocks lie off the northern sides of Eizan tō; the two outermost, 67 feet (20^{m}4) and 47 feet (14^{m}3) high, respectively, lie nearly 2 cables northward of the eastern extremity of the eastern islet. Gyoku tō is a grassy islet, 34 feet (10^{m}4) high, lying nearly a quarter of a mile south-south-eastward of the western entrance point of Chinri kō and about one cable off the western shore of the bay, with a rock, which dries 9 feet (2^{m}7), between. Chin ri, situated on the south-western shore of Chinri kō, is the principal village of the Daikokuzan guntō; boats can land on a white sandy beach fronting the village, or on the right bank of a stream which flows out here. Ei ri is a small village on the south-eastern shore of the bay, and there is a small mole here which dries alongside; on the southern side of this village is a hillock 251 feet (76^{m}5) high. There are depths of less than 3 fathoms (5^{m}5) throughout the greater part of Chinri kō, except south-eastward of the eastern Eizan tō, where there are depths of from 3¾ to 5½ fathoms (10^{m}1). Gatō suidō, the approach to Chinri kō from the eastward, is described on page 429; when entering the bay from this direction care must be taken to avoid a reef, with a depth of one foot (0^{m}3) over it, lying about one cable northward of the northern extremity of Eiri hantō.

Temporary anchorage, in depths of from 14 to 19 fathoms (25^{m}6 to 34^{m}7), may be obtained off the north coast of Dai Kokuzan tō westward of Chinri kō, taking care to avoid the rocks southward of Kōzō tō

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Chart 3365.

(page 429). The tidal streams, which run along the eastern and western sides of Dai Kokuzan tō, meet here and are somewhat weaker.

The south-west coast of Dai Kokuzan tō, between Seisan matsu (*Lat. 34° 37′ N., Long. 125° 24′ E.*) and Katsurari matsu, about 1¼ miles north-westward, is cliffy and is fringed with numerous rocks above water; Uratan, the outermost of these, consists of two rocks, the higher being 11 feet (3m4) high, lying close together about midway between these two points and 1½ cables offshore.

Shinri ho, a bay immediately northward of Katsurari matsu, is sheltered from easterly winds, but a sea runs into it with south-westerly winds; there are depths of about 7 fathoms (12m8), mud, in the middle of the bay, but inshore the bottom is mostly rock. Geiroki san, 671 feet (204m5) high, is situated on the northern side of the entrance; from the northward or southward this hill appears as a pointed summit, but from the westward it is rounded. Shin ri is a village on the northern side of the inner part of the bay, and there is a quay here, but it dries alongside.

Kinsei shō, a reef with a least depth of 2 fathoms (3m7) over it, lies off the entrance to Shinri ho and about three-quarters of a mile north-westward of Katsurari matsu; there are depths of over 11 fathoms (20m1) close around this reef, and it is not usually marked by tide rips.

Konson ho is a small bay on the northern side of Geiroki san; there are depths of about 4 fathoms (7m3) in the middle of this bay, but the inner part is shoal. Kon ri is a hamlet at the head of the bay, and there is a small pier here.

The remainder of the west coast of Dai Kokuzan tō is but slightly indented, and consists mostly of cliffs. Hi ri is a village situated at the head of a small cove about 1½ miles north-north-eastward of Geiroki san; on the two entrance points of this cove are wooded hillocks, 146 feet (44m5) and 166 feet (50m6) high, respectively, which appear as islets.

Eizan tō.—Dangers.—Eizan tō (East island) is a wooded island lying off the east coast of Dai Kokuzan tō, and separated from it by Eizan suidō, a passage fully one mile wide; its northern, eastern, and southern coasts are precipitous cliffs, but the land slopes more gradually on the western side, and there are two coves here, only available for boats, with villages at their heads. The summit of the island, a sharp, rocky peak 789 feet (240m5) high, with some scattered trees on it, is situated in the south-eastern part. Eizan tō is difficult to identify from the eastward, as it does not show up plainly against Dai Kokuzan tō.

The coasts of Eizan tō are fringed with rocks, with deep water close outside. Tōkō sho, a rock 58 feet (17m7) high, lies close off the south-west point. Tō tō, a grassy islet 140 feet (42m7) high, lies close off the north-east point of the island. Shō Kō tō, a light-brown pointed rock, 61 feet (18m6) high, lies nearly one cable northward of Tō tō, and about 1½ cables farther northward is a rock which dries 8 feet (2m4). There are tide rips between these rocks when the tidal streams are at their strength. Kō shō, a reef with a least depth of 3¼ fathoms (5m9) over it, lies about 6 cables south-eastward of Tō tō; the tidal streams are very strong here, and, except at slack water, this reef is always marked by ripples and waterfalls. Saku shō, a rock with a depth of 3¾ fathoms (6m9) over it, lies about 1½ cables off the north-west point of Eizan tō.

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Eizan suidō is deep and free from dangers, but vessels passing through it are advised to avoid Eizan sentai, a bank extending about one mile northward from the north coast of Eizan tō; the shoalest part is in the middle of the western side, about half a mile northward of the north-west point of Eizan tō, where there is a depth of 11 fathoms (20^{m}1). There are overfalls on this bank when the tidal streams are at their strength.

Ga tō.—Ga tō (Wooded island) is a dark, wooded island lying about 3 cables off the north-eastern extremity of Eiri hantō, and is 343 feet (104^{m}5) high. The east coast is cliffy and fairly steep-to; the west coast is fringed with rocks, and two rocks, which dry, lie about one cable westward of the north point of the island.

Gatō suidō, the passage between Ga tō (*Lat. 34° 42′ N., Long. 125° 28′ E.*) and Eiri hantō, is barely a quarter of a mile wide between the rocks extending from either side, but there is a least depth of 10 fathoms (18^{m}3) in the fairway. The tidal streams are strong, and caution must be exercised when using it; overfalls occur in the narrowest parts of the passage. The tidal streams set north-westward and south-eastward; the maximum rate has been estimated at between 3 and 4 knots, but may be more at times.

Chōtō rettō.—This group of islands lies off the west coast of Dai Kokuzan tō and is separated from it by Chōtō suidō, which is about half a mile wide in its narrowest part.

Dai Chō tō (West island), the largest and southernmost of the group, is thickly wooded and its coasts are mostly precipitous cliffs. The hamlet of Chōtō stands on the cliff at the northern part of the east coast, but landing on the shingle beach at the foot is difficult. There is a small bay, with a shingle beach at its head, on the western side of the south point of the island. South-westward of Dai Chō tō the tidal streams run north-westward with the rising tide, with a maximum rate of 3½ knots, and south-south-eastward with the falling tide, with a maximum rate of 4 knots; overfalls occur with both streams.

Shō Chō tō is a grass-covered island lying close north-eastward of Dai Chō tō and is connected to it by a rocky ledge which nearly dries, and on which are some rocks above water; the summit of the island, 517 feet (157^{m}6) high, is situated at the south-western end.

Nai Bōtuku tō, a grass-covered island 297 feet (90^{m}5) high, lies close north-westward of the northern extremity of Shō Chō tō; its coasts are cliffy, and there is a conspicuous group of trees on a hill at its south-eastern end. A few small rocks, the outermost being 7 feet (2^{m}1) high, lie close off its north-western extremity. A spit, with depths of less than 6 fathoms (11^{m}0), extends nearly 4 cables northward from the north-east point of Nai Bōtuku tō, and on this spit are two islets, the northern and higher of the two being 117 feet (35^{m}7) high.

Chōtō suidō is divided into two parts by a ridge, with a least depth of 2¾ fathoms (5^{m}0) in the fairway over it, which connects the south-western extremity of Shō Chō tō to the west coast of Dai Kokuzan tō. In this channel the tidal streams run northward with the rising tide, and southward with the falling tide, with a maximum estimated rate of 2½ and 3½ knots, respectively, but a greater rate may be experienced; when either stream is at its strength there are heavy tide rips over the ridge, which is then impassable for boats.

Islands and dangers northward of Dai Kokuzan tō.—Kōzō tō

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(Bluff island) is a grass-covered island lying about one mile north-north-westward of the north-west point of Dai Kokuzan tō; its west coast is a perpendicular cliff rising to a sharp summit, 386 feet (117m6) high, which is a good mark when approaching Chinri kō from the north-westward. The east coast is also cliffy, but is lower. Naka no se, about 3½ cables southward of Kozō tō, is a shoal with a least depth of 4¾ fathoms (8m7).

Daiton tō, the largest of the islands northward of Dai Kokuzan tō, lies with Baitō matsu, its southern extremity, about 6 cables northward of the north point of Ga tō, and is separated from it by Jūtatsu suidō. This channel cannot be recommended, owing to the dangers on its southern side; Jūtatsuri gan, the eastern of these, is a rock, with two pinnacles which dry, lying about 3 cables north-eastward of the north point of Ga tō (*Lat. 34° 42′ N., Long. 125° 28′ E.*), Kakushi shō is a reef, with a least depth of 2¾ fathoms (5m0), lying about 1½ cables north-eastward of the same point, and it is marked by ripples, with occasional overfalls. On the northern side of the channel are two bare islets, named Hatsukon sho, the southern of which lies about 1½ cables southward of the south point of Daiton tō and is 17 feet (5m2) high; the northern islet is 27 feet (8m2) high. In Jūtatsu suidō the tidal streams run westward with the rising tide, and eastward with the falling tide; the maximum rate has been estimated at 2½ knots, but this may be exceeded at times.

Jōgan san, the summit of Daiton tō, is a peak situated near the eastern extremity of the island and is 537 feet (163m7) high. The coasts of Daiton tō are indented by several bays, which afford shelter to small craft with local knowledge. Gori wan, on the south-eastern side, is entered between the southern extremity of the island and a point nearly one mile north-eastward; Ka-Ko sho, an islet 80 feet (24m4) high, lies close off the latter point, and Jō-Ko sho, an islet 100 feet (30m5) high, lies close off a point about 4 cables northward. The shores of Gori wan are cliffy, except along the southern side of an inner bay at the head, where there is a sand and pebble beach; Kō sho, a wooded islet 123 feet (37m5) high, is connected to the southern entrance point of the inner bay by a ridge which dries. The bottom in the outer bay shelves too rapidly to afford secure anchorage, but there is good anchorage for small craft with local knowledge, except with easterly winds, in the inner bay, in depths of from 3 to 5 fathoms (5m5 to 9m1), mud. Go ri is a village on the southern side of the inner bay.

Meisakuchi ho is a small bay on the south-west coast of Daiton tō close westward of Baitō matsu, and has depths of about 5 fathoms (9m1) in the middle; there is a wooded hillock, 103 feet (31m4) high, at the head. The north-western entrance point of this bay is fringed by reefs for a distance of about one cable. Gikō matsu, the west point of Daiton tō, has a hillock on it 80 feet (24m4) high, and about 2 cables south-eastward of it is a conical hill 267 feet (81m4) high. Shō tō, a wooded islet 103 feet (31m4) high, lies close northward of Gikō matsu and is connected to it by a reef which dries. Close eastward of Gikō matsu is a shallow cove with a sandy beach at the head, and the village of Tomoku is situated here. Sō sho is a grass-covered islet, 202 feet (61m6) high, lying about one cable north-westward of Shō tō; two rocks, about 35 feet (10m7) high, lie close together about one cable

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off the south-western extremity of Sō sho, and a rock, which dries 7 feet (2^{m}1), lies nearly one cable off the north-west point of this islet. The channel between Shō tō and Sō sho is foul.

Tabutsu tō lies with its south-eastern extremity about one cable northward of Sō sho, and consists of a northern and southern part, which are joined together by a narrow neck of sand and pebbles, on which is Tason ri, the principal village of the islands northward of Dai Kokuzan tō. The summit of Tabutsu tō is situated on the western side of the northern part, and is 333 feet (101^{m}5) high and is covered with pine trees. The coasts of the island are mainly cliffs, and the north coast is fringed by rocks to a distance of about 1½ cables.

Daiton wan lies between the west coast of Daiton tō and the east coast of Tabutsu tō; the northern entrance to this bay lies between the northern extremity of Daiton tō and the east point of the northern part of Tabutsu tō, and is about 2 cables wide, with a least depth of 10 fathoms (18^{m}3) in the fairway. The south-western entrance, between Sō sho and the south coast of Tabutsu tō, is only about one cable wide, with depths of over 5 fathoms (9^{m}1) in the fairway, but care must be taken to avoid the rock off the north-west point of Sō sho. There are depths of from 4¾ to 17 fathoms (8^{m}7 to 31^{m}1) in the middle of Daiton wan, and small vessels with local knowledge can anchor in it, but the tidal streams are strong. Suiri ho is a narrow inlet on the eastern side of Daiton wan, and has depths of from 1¾ to 3 fathoms (3^{m}2 to 5^{m}5), mud; the village of Suiri is situated at the head. There is also a shallow cove on the eastern side of Tabutsu tō, between the northern and southern portions of this island; the head of this cove dries out for about 1½ cables, but the remainder affords safe anchorage for small craft.

Sō tō (North island) is an uninhabited island, covered with grass, lying about half a mile north-westward of Tabutsu tō. It has three peaks, the north-western and highest is 432 feet (131^{m}7) high; the south-eastern one, 389 feet (118^{m}6) high, is rounded and covered with grass; the middle one is 353 feet (107^{m}6) high and has a black, pointed crag on its summit. The coasts are cliffy and are fringed by high rocks in places. Shunsho suidō, the passage between Sō tō and Tabutsu tō, is divided into two parts by some high, barren rocks lying off the western entrance, leaving a narrow passage on either side, in which the tidal streams are strong. Kyū tō is a rock, 153 feet (46^{m}6) high, lying about 1½ cables off the middle of the north-east coast of Sō tō and connected to it by a reef.

Jō-Chiku tō (*Lat. 34° 46′ N., Long. 125° 26′ E.*) and Ka-Chiku tō (Double island) are two uninhabited islands separated from each other by a very narrow passage; Jō-Chiku tō, the western island, lies with its southern extremity about 4 cables north-eastward of the north point of Sō tō, and the passage between these two islands is foul. Jō-Chiku tō is 300 feet (91^{m}4) high and is fringed with rocks; a tongue of land, terminating in a hillock 97 feet (29^{m}6) high, extends from the middle of its eastern side. Ka-Chiku tō is 310 feet (94^{m}5) high; its south-western extremity is a narrow promontory with a large, bare rock, 84 feet (25^{m}6) high, close off it. On the north-eastern extremity of this island is a prominent crag, 189 feet (57^{m}6) high, and a conspicuous conical rock, 136 feet (41^{m}4) high, lies about one cable north-eastward of this point.

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Jō-Kon sho consists of three bare rocks close together, the middle one of which is 54 feet (16^{m}5) high and lies about half a mile eastward of the northern extremity of Ka-Chiku tō. About 4 cables east-south-eastward of Jō-Konsho is Ka-Kon sho, which consists of two bare, pointed rocks almost connected to each other; the south-eastern of these two rocks is 94 feet (28^{m}7) high. Southward of Ka-Kon sho the tidal streams run northward with the rising tide, and south-eastward with the falling tide, the maximum rate being about 2 knots; eddies are formed in the vicinity of these rocks when the tidal streams are at their strength.

Jori gan (Sylvia rock), the most dangerous rock among the Kokuzan group, lies nearly 3½ miles north-eastward of Ka-Kon sho and has a depth of 4 feet (1^{m}2) over it; this rock lies on a steep-to reef, with depths of less than 10 fathoms (18^{m}3) over it, extending about 2 cables north-westward and southward from the rock. The tidal streams near Jori gan are strong, and it is not always marked by ripples.

Kō tō.—Light.—Ko (Koi) tō is a wooded island lying about 9 miles westward of Dai Kokuzan tō. The island is divided into two parts by a low neck of land, and when seen from a distance north-westward appears as two separate islands; the northern part is 1,188 feet (362^{m}1) high, and the southern part is 745 feet (227^{m}1) high, both peaks having clumps of trees on them. The coasts of the island are precipitous cliffs. *See* views facing page 423.

Bafuho matsu is the rocky southern extremity of the island, and a rock, 58 feet (17^{m}7) high, lies close westward of it; the tidal streams are strong off this point. In general, the tidal streams run northward with the rising tide, and divide into two at Bafuho matsu, the reverse occurring with the falling tide; the tidal streams appear to turn about one hour after high and low water.

Chikukō ho, the small bay on the south-eastern side of the low neck of land connecting the two parts of Kō tō, has a beach of sand and shingle at its head; it affords shelter to small craft with local knowledge during northerly or westerly winds. Some rocks lie off the southern entrance point of the bay and also close off the southern shore; the northern side of the bay is deep. The hamlet of Kōtō ri is situated at the head of the bay.

En sho consists of three rocks lying within a distance of 3 cables from a point situated about three-quarters of a mile north-westward of Bafuho matsu; the middle and largest rock is 110 feet (33^{m}5) high. Tango tō (*Lat. 34° 41′ N., Long. 125° 10′ E.*), an islet 300 feet (91^{m}4) high, lies nearly one mile northward of En sho; there are depths of 3 fathoms (5^{m}5) in the narrow passage between this islet and the west coast of Kō tō.

Several rocks and islets lie within a distance of 8 cables north-westward of Suiryoku matsu, a rocky point at the northern extremity of Kō tō; Kō sho, an islet 241 feet (73^{m}5) high, is the north-westernmost and highest of these.

A light is exhibited, at an elevation of 308 feet (93^{m}9), from a white square concrete structure, 33 feet (10^{m}1) in height, situated on the northern end of Kō tō. A fog signal is sounded from the lighthouse.

MAIKOTSU SUIDŌ.—Maikotsu suidō (Single channel) lies

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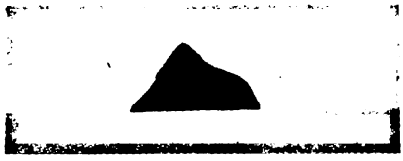
between the Kokuzan group and the islands lying off the southern end of the west coast of Korea. This channel is wide and apparently free from dangers in the fairway ; there are depths of over 20 fathoms (36^{m}6) throughout, except for a small bank, with a depth of 14 fathoms (25^{m}6), lying about 7 miles north-westward of Chiku tō (*see* below).

Maikotsu tō (Single islet) lies in the fairway of Maikotsu suidō and about 13 miles south-eastward of Eizan tō (page 428). It rises vertically on its northern side to an elevation of 468 feet (142^{m}6) and thence slopes down gradually to its southern extremity ; the highest parts are covered with trees and grass. A reef, with a rock above water on it, extends a short distance from the north-east point of the islet.



Maikotsu tō, bearing 119°, 4 miles.

Tidal streams.—On the eastern side of Maikotsu tō the north-going tidal stream runs from about 2½ hours after low water till about 2½ hours after high water at Kachō tō, and the south-going stream for the remainder of the time ; the maximum rate is 3 knots.

Islands and dangers on the eastern side of Maikotsu suidō.—Gyūji guntō.—Mōkotsu guntō, the group of islands in the eastern side of the southern entrance to Maikotsu suidō, has been described on page 421.

Gyūji (Ui) tō, the largest island of Gyūji guntō, lies with its south-western extremity about 7½ miles north-eastward of Maikotsu tō and has several peaks ; Kan-on san, the summit of the island, is a sharp peak 1,170 feet (356^{m}6) high, and is a good landmark. Gyūji wan (Ui bay), on the western side of the island, affords temporary shelter to vessels with local knowledge, with easterly winds only, in depths of from 2½ to 6 fathoms (4^{m}1 to 11^{m}0) ; the southern side of the bay is formed by a peninsula, 822 feet (250^{m}5) high, covered with stunted trees and connected to the main part of the island by a low isthmus. Kakō gan, a rock which dries 4 feet (1^{m}2), lies about one cable north-westward of the southern entrance point of Gyūji wan ; Fukugai sho, a rocky islet 71 feet (21^{m}6) high, lies about 4 cables south-westward of the northern entrance point of this bay, and there are two rocks above water about one cable off this point. Gyūjitō ri is a village on the eastern side of the island, but landing is difficult on the beach fronting this village owing to the surf. A sandbank, with depths of less than 5 fathoms (9^{m}1) over it, extends nearly 3 miles southward from the southern side of Gyūji tō ; Gyoraku tō (Ragged islet), 274 feet (83^{m}5) high, lies on the western part of this bank.

Several islets lie within a distance of 1½ miles off the eastern side of Gyūji tō ; the easternmost and largest of these is 271 feet (82^{m}6) high and has a village on its south-west coast.

Chiku tō (*Lat. 34° 34′ N., Long. 125° 53′ E.*), a rocky islet 244 feet (74^{m}4) high, with a group of trees on its summit, lies about 2½ miles

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south-eastward of Gyūji tō; there are a few houses on its south-eastern side. Bi tō (Kodori tō) lies about one mile eastward of Chiku tō, and is cliffy except on its northern side. Several islets and rocks lie within a distance of one mile north-westward of Bi tō. Keitei tō consists of two rocks close together lying about one mile northward of Bi tō; the southern and higher of the two is 107 feet (32m6) high.

Gyūji satai extends nearly 7 miles southward from Chiku tō, and has depths of from 2¾ to 5 fathoms (5m0 to 9m1) over it. Gaikō satai (Toduku bank), with depths of from 1¼ to 5 fathoms (2m3 to 9m1), lies eastward of and parallel to Gyūji satai, with a deep channel, about 2 miles wide, between them.

The islets and rocks lying northward of Gyūji tō are described on page 437.

Shichihatsu tō, bearing 128°, 11.5 miles.

Shichihatsu tō.—Light.—Shichihatsu tō is an islet, 307 feet (93m6) high, lying about 10 miles northward of the north-west point of Gyūji tō. Two rocks, which dry 6 feet (1m8), lie about 3 cables west-south-westward of the islet. A bank, with depths of from 3¼ to 6 fathoms (5m9 to 11m0), extends about 1½ miles northward from a position about 3 cables northward of Shichihatsu tō.

A light is exhibited, at an elevation of 334 feet (101m8), from a white circular brick tower, 22 feet (6m7) in height, situated on the summit of Shichihatsu tō. A fog signal is sounded and a W/T fog signal is transmitted from the lighthouse.

There is a W/T D.F. station on Shichihatsu tō; *see* Admiralty List of Wireless Signals. Passing vessels can communicate with a signal station on the islet.

The banks northward of Shichihatsu tō are described on page 436.

Tidal streams.—About 1½ miles eastward of Shichihatsu tō the north-going stream runs from about 1½ hours after low water till about 1½ hours after high water in Hikin suidō, and the south-going stream runs for the remainder of the time; the maximum rate of either stream is about 4 knots.

Magnetic disturbance.—Between 1925 and 1933 several vessels have reported local magnetic disturbance between 15 and 19 miles north-westward of Shichihatsu tō. In 1936 a vessel reported having experienced an easterly error of 12° in a position about 16 miles north-north-westward of this islet.

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RASHŪ GUNTŌ.—Rashū guntō (Naju group) comprises the numerous islands lying eastward of Gyūji guntō and Shichihatsu tō, and cover a distance of about 25 miles in a north and south direction. These islands lie in the approach to Mokuho (page 448), and the main passages along the southern and eastern sides of the group are described with the Approaches to Mokuho on pages 437—446.

Katai (Hautei) tō, the southernmost island of Rashū guntō, lies with its south-western extremity about 6 miles south-eastward of Bi tō, and forms the northern side of the entrance to the Teitō kai (page 439); it has several peaks, the one on the south-western extremity, 622 feet (189m6) high, being very conspicuous. Jijiji tō, a precipitous islet

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317 feet (96m6) high, lies about half a mile off the south-west point of Katai tō. Jōtai tō lies close northward of the eastern end of Katai tō, and is connected to it by a mud bank which dries. These two islands are separated from Ka-i (Haui) tō, which lies northward of the western end of Katai tō, by a narrow channel in which the tidal streams are very strong, and it is unsuitable as an anchorage; Yūkoku ri is a village on the eastern side of Ka-i tō.

Daiya (Moji) tō is a precipitous island lying about 1½ miles westward of the northern end of Ka-i tō, and has a conspicuous, bare summit, 1,061 feet (323m4) high. San-i tō (*Lat. 34° 38′ N., Long. 125° 56′ E.*), an islet 264 feet (80m5) high, lies about 2 cables off the western extremity of Daiya tō; a shoal, with a depth of less than 3 fathoms (5m5), extends about 6 cables from the northern end of San-i tō, and is continually changing, so that caution is necessary when approaching it. Daiya suidō is the channel along the southern and eastern sides of Daiya tō, and is bounded southward and south-eastward by Shin tō (Eagle island) and Ryōsan tō, respectively; the latter island lies close westward of the northern end of Ka-i tō. The summit of Shin tō is situated at the southern end of the island, and is 579 feet (176m5) high and conspicuous; there is a sharp peak, 369 feet (112m5) high, on the north-west point of the island.

Tosō (Toppuru) tō is a mountainous island lying with its southern extremity about three-quarters of a mile northward of Daiya tō; it forms the western side of Hakkō ho, where anchorage can be obtained in an area extending about 2 miles eastward from the eastern extremity of Tosō tō. Hakkō ho can be reached by many channels, available for vessels with local knowledge, but the best one is Tosō suidō, between Tosō tō and Daiya tō; Ga tō, an islet 186 feet (56m7) high, lies close off the south point of Tosō tō and on the northern side of this channel, and a shoal, with a least depth of 3½ fathoms (5m9), extends about one mile south-westward from the western end of Ga tō. Daiya suidō is the next best channel leading to Hakkō ho, but the tidal streams are stronger and more irregular than in Tosō suidō.

Hikin tō is separated from the northern side of Tosō tō by a channel about a quarter of a mile wide, only available for small vessels with local knowledge. The western and north-eastern parts of the island are hilly; the central part is low-lying, except for a few hillocks. Jikoku san, the bare, rocky summit of the island, is situated in the western part and is 832 feet (253m6) high; it is very conspicuous from the north-east and south-west, from whence it has the appearance of a jagged ridge. Several islets lie within a mile of the north-west point of Hikin tō; Gyusen tō, 202 feet (61m6) high, is the largest and northernmost of these. Shōdan tō, 153 feet (46m6) high, and Dobaku tō, 258 feet (78m6) high, lie about one and 1¾ miles, respectively, north-westward of the north-east point of Hikin tō. All these islets lie on the outer edge of a bank, with depths of less than 5 fathoms (9m1), extending as much as 2 miles off the north coast of Hikin tō. Hoku suidō, the northern channel leading into Hakko hō, lies northward of this bank; there are several precipitous islets in this channel, and the depths in it are not sufficient for large vessels.

Ji-on (Chaaon) tō, the northernmost island of Rashū guntō, lies with its western extremity about 3½ miles northward of the north-east point of Hikin tō, and forms the northern side of Hoku suidō. Tōhō

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san, the summit of Ji-on tō, is a conspicuous rocky peak, 1,190 feet (362m7) high, situated in the middle of the eastern side of the island; Yogan san is a double peak, 399 feet (121m6) high, situated on Jinsho matsu (Stony bluff), the western extremity of the island, and there is a peculiar rock on the southern of these two peaks. The south and north-west coasts consist of rocky promontories with sandy beaches between; the former is fringed by rocks and shoals to a distance of one mile.

Gantai (Amutei) tō lies south-eastward of Ji-on tō and is separated from it by a very narrow channel. The summit of Gantai tō is a conspicuous, rocky peak, 1,163 feet (354m5) high, situated in the north-western part of the island; there is also a conspicuous hill, 641 feet (195m4) high, situated on the central promontory on the eastern side of the island, from which a rocky ridge runs south-eastward and terminates in a conspicuous cliff. There is flat, arable land around the bases of these hills, and Dōshō ri, the principal village, is situated on the western side of the island. For description of the light on Gantai tō, *see* page 445. The islands lying southward of Gantai tō are described with Jiga kai on page 441.

Islets and banks north-westward of Ji-on tō.—U-tō (Kamaku somu) is a conspicuous rocky islet with a rounded top, 195 feet (59m4) high, situated about 4¼ miles northward of Jinsho matsu.

U-tō Minami satai (S. Kamakui somu bank) is a sandbank extending about 10 miles south-south-westward from a position about 4 cables southward of U-tō; there are depths of from 5 feet (1m5) to 3 fathoms (5m5) over the shoaler parts. The southern extremity of the bank lies about 3¼ miles eastward of Shichihatsu tō lighthouse.

U-tō Kita satai (N. Kamakui somu bank) is a sandbank extending about 6 miles north-north-eastward from a position about a quarter of a mile northward of U-tō; it has depths of less than 3 fathoms (5m5) over it, and one patch in the middle dries one foot (0m3).

Dai Chiba tō (South Rocky islet) is a precipitous islet, 195 feet (59m4) high, lying about 5 miles northward of U-tō. Shō Chiba tō (North Rocky islet), 120 feet (36m6) high, lies about half a mile northward of Dai Chiba tō, and is a similar islet. Dai Chiba tai is a sandbank with depths of from one foot (0m3) to 3 fathoms (5m5) over it, extending about 6 miles south-south-westward from Dai Chiba tō. In 1932, the *Heiwa maru* reported a depth of 1¼ fathoms (2m3) about 2¼ miles northward of U-tō.

Kunsōnyo (*Lat. 35° 02′ N., Long. 125° 52′ E.*) is a brown rock, 54 feet (16m5) high, lying about 5½ miles westward of Dai Chiba tō. Chyaasōnyo, a rock 12 feet (3m7) high, lies about 3 cables south-eastward of Kunsōnyo, and a rock awash lies about 2 cables southward of Chyaasōnyo. A 5-fathom (9m1) patch lies about 4 cables eastward of Kunsōnyo.

Sōnyo tai is a sandbank lying with its northern extremity about 4 miles southward of Kunsōnyo, and it extends about 2¼ miles southward from this position; the depths over it vary from 1¼ to 3 fathoms (2m3 to 5m5). About 6½ miles south-south-westward of Kunsōnyo is a bank with a least depth of 4¾ fathoms (8m7).

All the banks just described are approximately parallel to each other, and are steep-to on both sides; they are easily discerned, as in any wind or sea they are marked by long lines of waves.

Charts 104, 3480, 1262.

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Chart 3365.

Channel westward of Hikin tō and Tosō tō.—Islets and dangers.—Light.—Westward of Hikin tō and Tosō tō there is a deep channel, which is bounded westward by Gyūji guntō (page 433) and some islets and rocks lying northward of Gyūji tō; this channel forms one of the approaches to Teitō kai (page 439).

Sui tō (Hay rock), the northernmost islet on the western side of the above channel, lies about 5 miles northward of Gyūji tō, and is a conspicuous rocky islet 97 feet (29m6) high; a rock, with a depth of 5 feet (1m5) over it, which breaks in rough weather, lies about 1¼ cables southward of Sui tō. Fuku tō (Flat rock), an islet or rock, 27 feet (8m2) high, lies about three-quarters of a mile southward of Sui tō. Both these islets are steep-to.

Sekikō tō is a small grass-covered islet, 218 feet (66m4) high, lying about 1¼ miles south-south-eastward of Fuku tō; foul ground, with some rocks above water, extends about 2 cables southward from this islet. Rui tō lies about half a mile southward of Sekikō tō and is 189 feet (57m6) high; a rock, with a depth of 2 feet (0m6) over it, which breaks, lies about one cable south-westward of this islet. Shō Rui tō, 150 feet (45m7) high, lies about 3 cables south-south-eastward of Rui tō.

Keichi tō (Clett island) lies about midway between Gyūji tō and Tosō tō, and has a flat summit, 425 feet (129m5) high, with some stunted trees on it and a conspicuous tree clump on the east shoulder; there are cliffs all round the island, and there are some houses on the southern side. Two rocks above water lie close off the south-west point, and a conspicuous black rock, 20 feet (6m1) high, lies about one cable off the north-west point. Keichi tō divides the channel into two parts, that on the western side is named Keichi Nishi suidō, and the eastern one is named Keichi Higashi suidō.

A light is exhibited, at an elevation of 144 feet (43m9), from a white square brick tower, 26 feet (7m9) in height, situated on the eastern extremity of Keichi tō (*Lat. 34° 39′ N., Long. 125° 54′ E.*).

Jūtatsu gan is an isolated rock, which dries 11 feet (3m4), lying about 1½ miles eastward of the east point of Keichi tō and on the northern side of the western entrance to Tosō suidō (page 435); the fairway through Keichi Higashi suidō lies between this rock and Keichi tō.

Gyūji suidō is the channel between the northern extremity of Gyūji tō and Shō Rui tō, and is deep on the northern side, but a bank, with depths of less than 5 fathoms (9m1), extends about 1¼ miles from the north-west coast of Gyūji tō.

Tidal streams.—In Keichi Higashi suidō the tidal streams set northward with the rising tide, and southward with the falling tide, turning about half an hour after high water and low water in Hikin suidō; the maximum rate of either stream is 4 knots.

In Gyūji suidō the tidal streams may attain a rate of from 3 to 4 knots.

Local magnetic attraction.—There is local magnetic attraction over a considerable area in the channels on either side of Keichi tō, and also in Gyūji suidō, causing a westerly error of from 3° to 6°.

APPROACHES TO MOKUHO.—The southern and deepest approach to Mokuho is through Teitō kai (Chegutsugu pata) and Jiga kai (Shia pata). The northern approach is through Mentō suidō (page 445), where the least depth is 4 fathoms (7m3).

Charts 104, 3480, 1262.

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Chart 3365.

Islands and dangers in the south-western and southern approaches to Teitō kai.—Soku tō, at the northern end of Chōtō ho, has been described on page 420. Totsugyoku tō lies nearly three-quarters of a mile westward of Soku tō, and has a thickly wooded summit 376 feet (114^{m}6) high. Sai tō, an islet 123 feet (37^{m}5) high, lies about one mile westward of the northern extremity of Totsugyoku tō, and about 1½ miles farther westward is Toryō sho (Roran yo), a rock 8 feet (2^{m}4) high; a rock, with a depth of 2 fathoms (3^{m}7) over it, lies about 4 cables north-eastward of Toryō sho. Gai Hei (Bokekarimen) tō lies with its southern extremity about 6 cables north-north-eastward of Sai tō and is 363 feet (110^{m}6) high; a shoal, with a least depth of 4½ fathoms (8^{m}2), lies about 3 cables north-westward of its northern extremity. Nai Hei tō, 484 feet (147^{m}5) high, lies about one mile eastward of Gai Hei tō; there is a village at the head of a shallow bay on the western side of the northern end of this island. A rock, with a depth of 6 feet (1^{m}8) over it, lies nearly one mile north-westward of the north point of Nai Hei tō, and a 3½-fathom (6^{m}4) patch lies about 8 cables eastward of the same point. Hakuya tō is a rocky island, 434 feet (132^{m}3) high, lying about 1½ miles eastward of Nai Hei tō. Ka tō, an islet 202 feet (61^{m}6) high, lies about half a mile eastward of the northern extremity of Hakuya tō; Rō sho, a rock which dries 10 feet (3^{m}0), lies about 2 cables south-westward of Ka tō, and a rock, which dries 6 feet (1^{m}8), lies about one cable off the northern extremity of this islet.

Jō-Ka tō (*Lat. 34° 23′ N., Long. 126° 02′ E.*), an islet 235 feet (71^{m}6) high, lies nearly one mile eastward of Ka tō, and Ka-Ka tō, 198 feet (60^{m}3) high, lies close southward of Jō-Ka tō. Jonan (Taasonnamu) tō is a cultivated island lying with its southern extremity about three-quarters of a mile north-eastward of Jō-Ka tō; Shō-Jonan tō lies close westward of Jonan tō and is 359 feet (109^{m}4) high. Chō tō (Saa somu), about one mile westward of Shō-Jonan tō, rises to an elevation of 405 feet (123^{m}4) on its western side and is covered with low trees.

Hokushō tō (Puku soru somu), nearly 1½ miles north-westward of Chō tō, has a somewhat pointed summit, 432 feet (131^{m}7) high; a shoal spit extends about 3 cables northward from this islet. Bōsa (Bōsha) tō, 231 feet (70^{m}4) high, lies nearly three-quarters of a mile eastward of Hokushō tō. Both these islets are covered with low trees.

Gaikō tō, an islet 307 feet (93^{m}6) high, lies about 2 miles northward of Hokushō tō, and appear pointed when seen from the southward; Setsuyū tō (Todoku somu), an islet 264 feet (80^{m}5) high, lies about 2 cables southward of Gaikō tō, and there is a rock, with a depth of 4 feet (1^{m}2) over it, between them. Katoku tō, a flat-topped islet 261 feet (79^{m}5) high, covered with grass, lies nearly half a mile south-eastward of Gaikō tō.

Tidal streams.—From observations made during spring tides in a position about 3 miles northward of Gai-Hei tō, it appears that the tidal streams attain their maximum rate about one hour before high water and low water at Kachō tō, and that during 12 hours their directions change through 360° clockwise. At about one hour before high water the tidal stream runs north-north-east, at a rate of about 2½ knots; at about 2 hours after high water it runs south-south-east,

Charts 104, 3480, 1262.

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Chart 3365.

at a rate of about 1¾ knots; at about one hour before low water it runs south, at a rate of about 2¾ knots; at about 2 hours after low water it runs west-south-west at a rate of nearly one knot.

At a position about 6 miles westward of Gai-Hei tō, observations made during spring tides show that the tidal streams are strongest at about the times of high water and low water at Kachō tō; their directions also alter 360° clockwise in 12 hours, but the changes are not so marked as in the position given above. At high water the tidal stream runs north at a rate of 2¾ knots; 3 hours after high water it runs east at a rate of about 1¼ knots; at low water it runs south, at a rate of 3 knots; at 3 hours after low water it runs west, at a rate of about three-quarters of a knot.

Teitō kai.—Islets and dangers.—Lights.—Teitō kai (Chegutsugu pata) is the channel between the north-west coast of Chin tō and the south-eastern islands of Rashū guntō; it forms the southern approach to Mokuho, and can be entered from the southward through Chōchiku suidō (page 415).

Kasa (Kacha) tō lies in the middle of the south-western entrance to Teitō kai, with its southern extremity about 2½ miles eastward of Gaikō tō. This island is hilly, the only flat land being at the head of a bay, entirely filled by a mud flat which dries, on the north-eastern side of the island. Shu san, the summit of the island, is situated in the northern part, and is a double peak 600 feet (182m9) high; Dai san, at the southern end of the island, is 543 feet (165m5) high. These two hills are conspicuous from the westward, but from the southward only the northern one stands out. Ba tō is a bare, flat islet, 208 feet (63m4) high, lying about three-quarters of a mile westward of the south point of Kasa tō, and close off this point is a conspicuous rock, 225 feet (68m6) high, named Daishōdō tō; vessels proceeding northward from Chōchiku suidō can pass on either side of Ba tō, as the channels are deep.

A light is exhibited, at an elevation of 220 feet (67m1), from a white circular brick tower, 24 feet (7m3) in height, on the south point of Kasa tō (*Lat. 34° 28′ N., Long. 126° 03′ E.*)

Butsu (Putchi) tō lies nearly 1½ miles south-eastward of the south point of Kasa tō, and is an islet 248 feet (75m6) high, with a group of trees on its summit.

A chain of islets lies from a half to about one mile off the north-west coast of Chin tō on the eastern side of the entrance to Teitō kai. Kakukitsu tō, the southernmost of these, lies about one mile south-eastward of Butsu tō and is a conspicuous rocky islet, 326 feet (99m4) high; during foggy weather, vessels frequently anchor about one mile southward of this islet. Kyoku (Hyoru) tō lies about half a mile north-north-eastward of Kakukitsu tō and is 166 feet (50m6) high; Santō tō, 61 feet (18m6) high, lies about 2 cables north-eastward of Kyoku tō. Chō (Chaon) tō, the northernmost and largest islet, lies about three-quarters of a mile northward of Santō tō and has two summits, the northern and higher being 267 feet (81m4) high. The passage between this chain of islets and Butsu tō is used by vessels proceeding through Teitō kai from Chōchiku suidō.

Shushi tō lies about half a mile eastward of Kasa tō and is 625 feet (190m5) high; there is a large, conspicuous boulder on its summit, and it is the best landmark in the neighbourhood. A shoal, with a rock 18

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Chart 3365.

feet (5m5) high in its outer end, extends about a quarter of a mile from the western side of Shushi tō. Ryōtokō tō, 431 feet (131m4) high, lies about 6 cables eastward of Shushi tō, and has a rock of peculiar shape on its summit; this islet is thickly covered with pine trees and is a good landmark.

Ban sho, a rock 9 feet (2m7) high, lies about one mile north-westward of the northern extremity of Kasa tō and nearly in the middle of the northern channel in the south-western entrance of Teitō kai. Ton sho, a rock 9 feet (2m7) high, lies nearly 2¼ miles north-eastward of Ban sho.

About midway between Ryōtoku tō and Katai tō (page 434) is a group of four islets. Kōdai tō, the north-eastern and largest of these, lies about 2 miles northward of Ryōtoku kō and is 247 feet (75m3) high; it has a high, conspicuous cliff on its eastern side, and in 1928 there were some dwellings on its north-western side. The other three islets lie close together south-westward of Kōdai tō, and Shō tō, the easternmost of these, is 143 feet (43m6) high and lies about half a mile south-westward of Kōdai tō; the other two are connected to each other by a shingle bank which dries. The depths in the vicinity of these islets, and between them and Kasa tō, are irregular.

Hōkō tō consists of three precipitous islets lying close together nearly 1¼ miles south-eastward of Kōdai tō; the north-eastern and largest of these is 244 feet (74m4) high. These islets lie on a bank, with depths of from 5 to 10 fathoms (9m1 to 18m3), extending about 3 miles north-eastward from Ryōtoku tō.

A rock, 6 feet (1m8) high and steep-to, lies about one mile south-eastward of Ryōtoku tō and on the south-eastern side of the fairway through Teitō kai. Cho tō, an islet 176 feet (53m6) high, with some dwellings on its southern side, lies about 2¾ miles north-eastward of Ryōtoku tō and about 6 cables off the north-west coast of Chin tō. South-eastward of the line joining this islet and the 6-foot (1m8) high rock just mentioned are several rocks and sandbanks; one of these, 19 feet (5m8) high, lies about midway between the two. A rock, with a depth of 5 feet (1m5) over it, lies about half a mile east-north-eastward of the east point of Cho tō.

Sakuriki tō (*Lat. 34° 32′ N., Long. 126° 10′ E.*), a cliffy islet with a flat summit, 166 feet (50m6) high, lies nearly 1½ miles north-north-eastward of Cho tō and in the middle of the main fairway through Teitō kai; a bank, with depths of less than 10 fathoms (18m3), extends nearly three-quarters of a mile eastward from Sakuriki tō.

Shō tō, a round-topped islet 156 feet (47m5) high, with a single pine tree on it, lies nearly 2 miles north-eastward of Sakuriki tō; a rock, with a depth of 5½ fathoms (10m1) over it, lies about 4 cables north-north-eastward of Shō tō. Kotsu tō, 123 feet (37m5) high, lies about half a mile east-south-eastward of Shō tō; a sandbank, with a least depth of 3 fathoms (5m5) over it, extends about three-quarters of a mile northward from a position nearly half a mile north-eastward of Kotsu tō.

Ritsu tō lies fully one mile north-westward of Shō tō, and is the northernmost and largest of three islets close together; it has two summits of about the same elevation, and on the southern of these is a group of pine trees, the tops of which are elevated 238 feet (72m5). There is a village on the east coast of Ritsu tō. The central islet is named Sairitsu tō, and the southern one is Ki tō.

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Chart 3365.

A light is exhibited, at an elevation of 88 feet (26m8), from a white circular brick tower, 24 feet (7m3) in height, on Ki tō.

Kosa tō, about 2 miles westward of Ki tō, is a conspicuous conical islet, 461 feet (140m5) high. Heisa tō, close northward of Kosa tō, has a rounded summit, 117 feet (35m7) high; it is well cultivated, and there is a village on its south-eastern side. These two islets lie on a shoal, with depths of less than 3 fathoms (5m5), which extend about one mile south-westward from Kosa tō.

An islet, 185 feet (56m4) high, lies about 6 cables north-westward of Ritsu tō, and a rock, with a depth of 3½ fathoms (6m4), lies about a quarter of a mile south-westward of this islet. An isolated, steep-to rock, with a depth of 6 feet (1m7) over it, lies about 1¼ miles north-eastward of Ritsu tō; owing to the muddy state of the water, the position of this rock is not easily discerned.

Tidal streams.—Off the south-western entrance to Teitō kai, between Chō tō and Kasa tō, the tidal stream runs north-eastward from about 1½ hours after low water till about 1½ hours after high water at Kachō tō, with a maximum rate of about 3 knots; for the remainder of the time the stream runs south-westward, with a maximum rate of about 4 knots.

About midway between Kasa tō and Katai tō the tidal stream runs eastward from about 2 hours after low water till about 2 hours after high water at Katai tō, with a maximum rate of about 2½ knots; for the remainder of the time the stream runs westward, with a maximum rate of about 3 knots.

At the north-eastern end of Teitō kai, between Ki tō and Shō tō, the tidal streams run north-eastward with the rising tide, and south-westward with the falling tide, turning about half an hour after high water and low water at Jika tō; the maximum rate of the former is about 3 knots, and that of the latter about 4 knots.

Jiga kai.—Islets and dangers.—Light.—Jiga kai (Shia pata), the channel between the south-eastern islands of Rashū guntō and Kagen hantō, a peninsula on the main coast immediately northward of Meiyō to (page 413), is a continuation northward of Teitō kai.

Chosan (Chagusan) tō, on the western side of the southern entrance to Jiga kai, lies with its eastern extremity about 3 miles northward of Ritsu tō; there are several hills on this island, but the only conspicuous one is Go-on san (*Lat. 34° 40′ N., Long. 126° 09′ E.*), 677 feet (206m3) high, situated on the northern extremity. The western side of Chosan tō forms the south-eastern side of Hakkō ho (page 435); the channels northward and southward of Chosan tō, leading into Hakkō ho, are narrow, intricate, and only suitable for small craft with local knowledge. Bashin tō, a flat-topped island 74 feet (22m6) high, lies close south-eastward of the eastern extremity of Chosan tō and is fringed with rocks. Anshō tō lies with its southern extremity nearly 2 miles northward of the northern extremity of Chosan tō, and there are two islands and several islets between. Kisa (Kiisaa) tō lies close westward of Anshō tō, and Hachikin tō is separated from the northern sides of these two islands by a narrow channel; the north-eastern extremity of Hachikin tō is a peninsula with a conspicuous rocky peak on it, 461 feet (140m5) high.

The bottom throughout Jiga kai is very irregular, and there are several rocky islets on either side of the fairway. An islet, 54 feet

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Chart 3365.

(16m5) high, lies about 2¼ miles north-eastward of the east point of Bashin tō and about 4 cables off the eastern shore of the channel; Shakutō tō, an islet 77 feet (23m5) high, lies about 1¼ miles northward of the above islet and on a spit which extends about a quarter of a mile from the eastern shore. On the western side of the fairway and about 2 miles westward of Shakutō tō is an islet 51 feet (15m5) high.

Jika (Jiihaa) tō lies nearly 1½ miles northward of Shakutō tō and on the eastern side of the fairway, and has a flat summit, 110 feet (33m5) high, on the northern side of the island; there is a conspicuous clump of trees eastward of the lighthouse, and a small village is situated on the east coast.

A light is exhibited, at an elevation of 122 feet (37m2), from a white circular concrete tower, 25 feet (7m6) in height, on the north-western part of Jika tō.

A shoal, with depths of less than 5 fathoms (9m1), extends nearly one mile southward from the southern side of Jika tō; the shoalest spot, with a depth of 4 feet (1m2) over it, lies about half a mile south-south-eastward of the lighthouse. Between the southern end of this shoal and Shakutō tō there are depths of about 9 fathoms (16m5). A bank, with general depths of from 3½ to 5 fathoms (6m4 to 9m1) over it, extends about 2 miles northward from Jika tō, but on the shoalest spot, nearly 1¾ miles north-north-eastward from the lighthouse, there is a depth of only 2¼ fathoms (4m1).

A rock, with a depth of 6 feet (1m8) over it, lies nearly one mile west-south-westward of Jika tō lighthouse; a rocky ledge, with depths of less than 10 fathoms (18m3) over it, extends about half a mile southward from this rock. The depths are very irregular in the channel westward of Jika tō. A rock above water lies nearly 1½ miles west-south-westward of Jika tō lighthouse, and about 1½ cables west-north-westward of this rock is a rock which dries 6 feet (1m8).

Yoriki tō, a flat-topped islet 133 feet (40m5) high, with a group of trees on its southern extremity, lies about 3 miles north-westward of Jika tō and on the mud bank which extends about half a mile from the eastern side of Anshō tō. A rock, with a depth of 1½ fathoms (2m7) over it, lies about half a mile eastward of Yoriki tō.

Fumuki tō (Purumukii), nearly 3½ miles northward of Jika tō, is a flat islet, 71 feet (21m6) high, covered with grass, and is a useful mark in clear weather. A shoal, with depths of less than 5 fathoms (9m1), extends about 4 cables northward from Fumuki tō, and a shoal, with a least depth of 4¾ fathoms (8m7) over it, lies about three-quarters of a mile northward of this islet. A rocky patch, with a least depth of 3 fathoms over it, lies nearly 1¾ miles south-eastward of Fumuki tō. A shoal, with a least depth of 2½ fathoms (4m6) over it, lies about 2¼ miles eastward of Fumuki tō (*Lat. 34° 46′ N., Long. 126° 13′ E.*) and 6 cables off the north-western extremity of Kagen hantō. The islets and dangers northward of Fumuki tō are described with the Northern approach to Mokuho on pages 445, 446.

Tidal streams.—Near the middle of the passage through Jiga kai the tidal streams run northward with the rising tide, and southward with the falling tide; the tidal streams turn about half an hour after high water and low water at Jika tō, and their maximum rate is 4 knots.

The direction of the tidal streams about one mile eastward of Fumuki tō is the same as in the middle of Jiga kai, but the maximum rate of the

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Chart 3365.

north-going stream is about 1½ knots, and that of the south-going stream about 2 knots.

Directions.—For vessels proceeding to Mokuho through Teitō kai the recommended track from the westward passes southward of Hokushō tō and Bōsa tō (page 438), and thence between Kasa tō and Butsu tō. Vessels from the south-eastward, having passed through Chōchiku suidō (page 415), can pass eastward of Butsu tō.

Proceeding north-eastward through Teitō kai the track passes either side of Ryōtoku tō (page 440) and the group of three islets named Hōkō tō; if passing south-eastward of Ryōtoku tō vessels must pass north-westward of Cho tō and the dangers lying south-westward of this islet. Sakuriki tō (page 440) can be passed on either side, and the track then runs between Shō tō and Ki tō (for light, *see* page 441).

When about 2 miles northward of the northern extremity of Chin tō, and Nissei hō, a peak on the eastern side of Kagen hantō 1,094 feet (333m4) high, bears 074°, a northerly course should be set to pass through Jiga kai. A mid-channel course should be steered between Jika tō and the rock, with a depth of 6 feet (1m8) over it, lying about one mile west-south-westward of the lighthouse on this island; the summit of Eki tō, an islet 377 feet (114m9) high, lying about 5 miles northward of Fumuki tō, bearing about 356° and just open eastward of the latter, leads eastward of this rock. Course should then be shaped to pass eastward of Fumuki tō and the shoal, with a least depth of 4¾ fathoms (8m7), lying northward of this islet, and continuing far enough northward so as to approach Mokuho kuchi (page 446) on an east-south-easterly course; when between Jika tō and Fumuki tō care must be taken to avoid the bank which extends northward from the former. Directions for entering Mokuho kō from Teitō kai are given on page 449.

Chart 913.

Northern approach to Mokuho.—Dangers.—Lights.—On the eastern side of the northern approach to Mokuho are numerous islands and banks which extend some 10 miles from the coast northward of Mokuho; the northern part of the western side is formed by four groups of islets.

Hichi (Pichi) tō, the northernmost group, consists of two uninhabited cliffy islets, covered with grass, the south-eastern of which lies about 17½ miles north-north-westward of the north point of Ji-on tō (page 435); these islets are steep-to, but the depths around them are irregular.

Kyosa guntō (Hosa group) consists of two uninhabited grass-covered islets, with some off-lying rocks. Dai-Kyosa tō, the eastern of the two, lies nearly 4 miles southward of the south-eastern Hichi tō and is steep-to on its eastern and western sides; a shoal, with depths of less than 3 fathoms (5m5) extends about one mile north-eastward from its northern side, and some rocks lie within a quarter of a mile of its southern side. Shō-Kyosa tō (*Lat. 35° 08′ N., Long. 125° 53′ E.*) the western islet, is cliffy; a shoal, with depths of less than 3 fathoms (5m5), extends about 1½ miles south-south-westward from it.

Funan guntō (Punan group) is a group of several islets and rocks lying on a shoal bank. Funan (Punan) tō, the northernmost, lies about 2¾ miles southward of Dai-Kyosa tō and has cliffs all round; there is a shingle beach on its southern side, and a few dwellings stand on the cliffs above. A conspicuous rock, 41 feet (12m5) high, with a

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Chart 913.

smaller rock close westward of it, lies about three-quarters of a mile eastward of Funan tō. Three small islets lie within half a mile of the southern side of Funan tō. Ryūbō tō is a cliffy islet nearly three-quarters of a mile southward of Funan tō, and there is a group of trees on its summit; a rock, which dries 12 feet (3m7), lies about a quarter of a mile north-westward of this islet. Kutsu tō lies about 3 cables south-eastward of Ryūbō tō. Katsu (Kari) tō, nearly half a mile eastward of Kutsu tō, has two peaks, and there is a conspicuous group of trees on the southern and higher, which is 349 feet (106m4) high; there are a few dwellings on the western side of this islet. Small vessels with local knowledge can obtain anchorage off the southern side of Funan tō with northerly winds, and off the western side of Katsu tō with easterly winds.

Dai-Rōroku (Kunnoroku) tō is a cliffy islet lying nearly 3 miles north-eastward of Katsu tō, and Shō-Rōroku tō lies close southward of the former. A shoal, with a depth of 2½ fathoms (4m1), lies about half a mile northward of Dai-Rōroku tō, and there is another shoal patch between. A 3-fathom (5m5) patch lies about 2½ miles northward of Dai-Rōroku tō, and in 1937 depths of less than 3 fathoms (5m5) were reported within a distance of half a mile south-westward of this position. In 1930 the *Tsugaru maru*, with a draught of 15 feet (4m6), reported having grounded about 4½ miles northward of Dai-Rōroku tō. The channel between Shō-Rōroku tō and Funan guntō is only suitable for small craft.

A light is exhibited, at an elevation of 224 feet (68m3), from a white circular concrete tower, 15 feet (4m6) in height, situated on the south-eastern part of Dai-Rōroku tō.

Funan guntō and Rōroku tō lie on a sandbank which extends north-north-eastward towards Kakuji (Teikakuri) tō and the other islets and banks in this direction, which are described on page 452. The depths in the fairway over this bank, which must be crossed by vessels using the northern passage to Mokuho, are from 4 to 5 fathoms (7m3 to 9m1).

Jinshi (Yeichaa) tō lies with its south-western extremity about 3 miles south-eastward of Dai-Rōroku tō; it has several peaks, and Daiton (Hanton) san the summit of the island, 1,055 feet (321m6) high, situated in the southern part, is a good landmark. The north-west coast consists of a sandy beach about 4 miles long, off which a bank, with depths of less than 3 fathoms (5m5), extends fully one mile; there are several rocky islets off the outer edge of this bank, and Kakari (Hokkaru) tō, the outermost of these, lies about 1½ miles offshore and is 120 feet (36m6) high. Close off the south-western end of the sandy beach are two islets; Dai-Daiji tō, the western and larger of the two, has a wooded summit 333 feet (101m5) high to the tops of the trees. The south and east coasts of Jinshi tō are indented by several bays, but they are all filled with flats which dry. A bank, with depths of less than 3 fathoms (5m5), extends fully 2 miles from the southern side of the island.

Vessels proceeding to Mokuho from the northward pass between Dai-Rōroku tō and Jinshi tō. Zaien (Cheion) tō, an island with a conspicuous conical summit, 802 feet (244m4) high, divides this channel into two parts; Nishi suidō, the western of the two, is generally used, as it is fully one mile broad, deep, and free from dangers. Higashi

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Chart 913.

suidō, the eastern channel, is also deep, but is obstructed by some islets in the northern entrance. In both channels the tidal streams run northward with the rising tide, and southward with the falling tide, with a maximum rate of 3½ knots; the streams turn about half an hour after high water and low water at Anba tō (page 453), and the period of slack water is about ten minutes.

Shō Chiba tō, about 1½ miles south-eastward of Katsu tō, and the adjacent banks, have been described on page 436. After passing through Nishi suidō the fairway lies between the northern extremity of U-tō Kita satai and the bank extending from the southern side of Jinshi tō; the least depth here is 4 fathoms (7m3). The track then leads south-eastward, toward the entrance of Mentō suidō.

Charts 913, 3365.

Mentō suidō (Mion to channel) is the channel between the north-eastern side of Ji-on tō (page 435) and Sōtō shotō, which consists of two islands and some islets and rocks lying on a mud bank, which dries, north-eastward of Ji-on tō; the southern extremity of the southern of the two islands of Sōtō shotō lies about 3½ miles east-north-eastward off the northern extremity of Ji-on tō. Although this channel is about 2 miles wide, the shoals on either side reduce the navigable width, with a least depth of 4 fathoms (7m3), to about half a mile. Gaikatsu tō (*Lat. 35° 00′ N., Long. 126° 05′ E.*) lies about half a mile south-westward of the west point of Kōsō (Hujin) tō, the northern island of Sōtō shotō, and is a conspicuous conical islet, 110 feet (33m5) high, covered with grass. Zai-en tō, an islet 95 feet (29m0) high, shaped like a helmet and covered with grass, lies in the middle of the southern part of Mentō suidō and about one mile northward of the north-east point of Gantai tō (page 436). The fairway of the channel is westward of this islet and thence between the north-eastern extremity of Gantai tō and an islet, 254 feet (77m4) high, about three-quarters of a mile north-eastward.

The tidal streams in Mentō suidō run northward with the rising tide, and southward with the falling tide; near Gaikatsu tō the north-going stream may attain a rate of over 3 knots.

A light is exhibited, at an elevation of 118 feet (36m0), from a white circular brick tower, 23 feet (7m0) in height, situated on the east point of Gantai tō.

After passing the east point of Gantai tō the fairway to the entrance to Mokuho is approximately on the line joining this point and the northern extremity of Kagen hantō. Okai (Aapai) tō, well wooded and fertile, lies on the north-eastern side of the fairway, with its western extremity about 3½ miles east-south-eastward of the east point of Gantai tō; this island is surrounded by a mud flat, which dries. Sōkō (Sogukoguii) san is a conspicuous conical peak, 743 feet (226m5) high, situated on the south-western extremity of Okai tō, and close off this point is Eki tō, a conspicuous islet with a sharp summit 377 feet (114m9) high. A bank, with depths of less than 3 fathoms (5m5), extends about 2½ miles southward from Okai tō, and is covered by the *red* sector of Mokuho kuchi light (page 446) between the bearings 135° and 204°.

There are several islets on the western side of the fairway, off the east coast of Hachikin tō, and the principal of these are; Ka-Nōtoku, the easternmost and 38 feet (11m6) high, situated nearly 3 miles

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Charts 913, 3365.

northward of Fumuki tō (page 442); Ko tō, nearly 1¼ miles westward of Ka-Nōtoku tō and 28 feet (8m5) high; Jō-Nōtoku tō, about 6 cables south-westward of Ka-Nōtoku tō and 57 feet (17m4) high; Ryū tō, a conspicuous dark islet 140 feet (42m7) high, the southern half of which is wooded, lying about half a mile south-south-westward of Jō-Nōtoku tō; Kosa tō, about three-quarters of a mile south-westward of Ryū tō and 87 feet (26m5) high. There are irregular depths and several shoals westward of the line joining Ka-Nōtoka tō and Fumuki tō, and this area should be avoided; it is covered by a *red* sector of Mokuho kuchi light between the bearings 107° and 129°.

EIZAN KŌ.—Eastward of the northern part of Kagen hantō are the three peninsulas Kainan hantō (Haiamu peninsula), Reigan hantō (Yongan peninsula), and Muan hantō (Buan peninsula). Between these peninsulas are three rivers, which unite off the western end of Reigan hantō and are entered by a deep channel along the northern extremity of Kagen hantō. Kagen kō, the southern of these three rivers, flows between Kagen hantō and Kainan hantō; Kainan kō flows between Kainan hantō and Reigan hantō; Eizan kō (Yon san kan) flows between Reigan hantō and Muan hantō. Kagen kō and Kainan kō are more in the nature of creeks than rivers, and a few miles within their entrances the depths decrease rapidly. The town of Mokuho (*Lat. 34° 47′ N., Long. 126° 23′ E.*) is situated on the southern extremity of Muan hantō and on the northern bank of Eizan kō.

Chart 1558, plan of Mokuho kō.

Entrance channels.—Light.—Light-buoy.—The entrance to Eizan kō from the Jiga kai lies between the northern extremity of Kagen hantō and the southern extremity of Okai tō, about 3¾ miles north-north-eastward, but it is considerably obstructed by a number of islands, between which are three channels. Only the southern of these, known as Mokuho kuchi, is available for shipping; the remaining two, named Nakano kuchi and Kitāno kuchi, are only suitable for small craft.

Mokuho kuchi, between the northern extremity of Kagen hantō and the southern extremity of Tatsuri tō, is about 3 cables wide, with depths of about 16 fathoms (29m3), and is free from dangers.

Mokuho kuchi light is exhibited, at an elevation of 106 feet (32m3), from a white circular concrete tower, 19 feet (5m8) in height, situated on the northern extremity of Kagen hantō.

Gaitatsu tō, situated about three-quarters of a mile northward of the northern extremity of Kagen hantō, is a hilly island, 202 feet (61m6) high, covered with pine trees, and there is a village on its south-western side. Rocks and shoals extend about 4 cables from the western side of the island, and a rock, 16 feet (4m9) high, lies about 2 cables off the south coast. Tatsuri tō is separated from Gaitatsu tō by a narrow channel with depths of over 6 fathoms (11m0) in the fairway; this island is also hilly and covered with pine trees, and there is a village on the eastern side. The north-eastern extremity of Tatsuri tō is Tensoku bi, a conspicuous hillock 70 feet (21m3) high, densely wooded and dark in appearance, connected to the main island by a narrow spit of sand.

Totsu tō lies close northward of Tatsuri tō and is separated from it

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Chart 1558, plan of Mokuho kō.

by Nakano kuchi; a range of hills, covered with pine trees, runs along the eastern side of this island, and its summit, 330 feet (100m6) high, is flat. Nakano kuchi is shallow throughout the greater part and the tidal streams are strong; Baku tō, an islet 70 feet (21m3) high, lies in the middle of the western entrance, and Chōsa tō and Gyū tō lie in the eastern entrance. Chōsa tō lies about 2 cables off the north-east point of Tatsuri tō, and has a densely wooded summit, 238 feet (72m5) high.

Kitāno kuchi (chart 3365), the narrow channel between the northern extremity of Totsu tō and the southern extremity of Okai tō, is shallow and the tidal streams are strong; three islets lie in its eastern entrance.

After passing through Mokuho kuchi the channel leading to Mokuho kō turns sharply northward along the eastern side of Tatsuri tō. Kōge tō lies on the eastern side of this part of the channel and close off the western extremity of Reigan hantō; Ryūtō (*Lat. 34° 47′ N., Long. 126° 21′ E.*), the northern extremity of this island, is a conspicuous headland 100 feet (30m5) high. Kyōsa tō lies about 4 cables south-westward of Kōge tō, and is connected to it by a mud bank which dries. The channel along the eastern side of Tatsuri tō is narrowed to a width of only about 2 cables in places, with depths of over 5 fathoms (9m1), by extensive shoals lying off the western side of Kōge tō and Kyōsa tō.

A red conical light-buoy, exhibiting a *white occulting* light *every six seconds*, is moored off the northern end of the shoals between Tatsuri tō and Kōge tō and about 3 cables north-westward of Ryūtō.

Tidal streams.—The tidal streams in Mokuho kuchi are abnormal. From observations made in the autumn, during spring tides, it appears that the stream in this channel turns, and flows westward with the ebb tide, as soon as it is high water in Mokuho kō. During the next hour the rate rises rapidly to 6 knots; two hours later it has reached its maximum rate of fully 10 knots; one hour before low water the rate is 6 knots, and during the next half hour it falls to 2½ or 3 knots. About the time of low water in the harbour the tidal stream in Mokuho kuchi turns, without any period of slack water.

The rate of the flood stream is less than that of the ebb. It attains its maximum rate of about 4 knots some two hours after low water; the rate then decreases slightly, but it is still as much as 3 knots one hour before high water, after which it decreases rapidly to one knot..

At night the flood stream appears to have the same characteristics as the ebb during the day, and attains a rate of 10 knots.

In summer, when the Eizan kō is in spate, the ebb stream is stated to attain a rate of 13 knots.

Many vessels proceed through Mokuho kuchi with the flood stream, and all avoid meeting the full strength of the ebb stream.

The major portion of the flood stream that comes in through Mokuho kuchi runs south-eastward up Kagen kō and Kainan kō; part of it, however, runs northward through the main channel between the western extremity of Reigan hantō and the two islands Kyōsa tō and Kōge tō into Mokuho kō, with a maximum rate of from 2 to 3 knots. Another part sweeps in between Tatsuri tō and Kyōsa tō, where it forms an eddy round the southern of the shoals between these two islands; about 3 hours after low water in Mokuho kō this eddy spreads out, and the tidal stream at its edges, along the eastern side of Tatsuri

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Chart 1558, plan of Mokuho kō.

tō and the western side of Kyōsa tō, is running at a rate of about 1½ knots. Part of the latter stream runs northward past Kōge tō, and sweeps round Ryūtō, at a rate of from 2 to 3 knots, eastward into the harbour.

The ebb stream comes down the Eizan kō, and part of it turns southward into the narrow channel between the western extremity of Reigan hantō and the islands Kōge tō and Kyōsa tō. The main portion strikes Kōge tō and is deflected northward along this island at a maximum rate of from 3½ to 4 knots; it then sweeps westward, at a maximum rate of from 4 to 5 knots, between Ryūto and the mudbanks extending westward from Muan hantō, whilst a branch of it runs round the north point of Chōsa tō into Nakano kuchi. Its main body runs southward along the eastern side of Chōsa tō, at a maximum rate of 3½ knots, and then eddies round the shoals westward of Kōge tō; the eddy gradually spreads out southward, and the main stream runs south-westward to the southern extremity of Tatsuri tō and thence through Mokuho kuchi. As a result of the foregoing, there is an almost constant stream running south-westward along the eastern side of Tatsuri tō, and a north-going stream up the western side of Kōge tō.

Mokuho kō.—Mokuho or Moppo kō is a Treaty port off the town of Mokuho (*Lat. 34° 47′ N., Long. 126° 23′ E.*); it is bounded northward by the south-western promontory of Muan hantō, and southward by the north-eastern side of Kōge tō and the north-western extremity of Reigan hantō; it is a natural harbour entirely protected from wind and sea. Sankaku tō is a small island lying on a mud flat close eastward of the town; a rock, which dries one foot (0m3), lies about one cable off the south-west point of this island. It is possible for vessels of 6,000 tons to enter the harbour, but, owing to the tortuous and narrow channel of access, combined with the strong tidal streams, this is difficult.

The anchorage is about 1½ miles long in an east and west direction, with depths of from 5 to 12 fathoms (9m1 to 21m9), mainly sand and mud; the best position is about 1½ cables southward of the town. It is inadvisable to anchor in mid-stream, where the tidal streams combine with the full strength of the river stream; it is also inadvisable to anchor near the line joining the point at the north-eastern end of the town, northward of Sankaku tō, to the lighthouse on the southern side of the harbour, as the tidal streams there are strong and irregular, although there is good anchorage eastward of this line. Small vessels can anchor in the creek between the north-eastern part of the town and Sankaku tō, where the depths are over 1½ fathoms over an area fully one cable wide.

Yutatsu san, close westward of the town, is a conspicuous hill with two peaks, the southern being 743 feet (226m5) high; its summit is a mass of large rocks of remarkable appearance, and is a good mark for determining the position of Mokuho from a distance. Hōsui hō, situated about 4½ miles north-eastward of Yutatsu san, is 668 feet (203m6) high, and has a large pointed rock on its summit. Two tall white chimneys of the power station, situated about 3 cables eastward of Nan kaku, the northern entrance point of the harbour, are conspicuous. Daiga san, situated on the southern side of the harbour and about one mile southward of Sankaku tō, is a conspicuous bare peak, 579 feet

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Chart 1558, plan of Mokuho kō.

(176m5) high. Nearly one mile westward of Daiga san a bund has been constructed on the southern shore of the harbour, and there are some conspicuous oil tanks on it.

Light.—A light is exhibited, at an elevation of 66 feet (20m1), from a white octagonal concrete tower, 20 feet (6m1) in height, situated on Muka tō, an islet in the northern entrance to the passage between Kōge tō and the north-western extremity of Reigan hantō.

Prohibited anchorage.—A submarine telegraph cable crosses the harbour between Sankaku tō and Reigan hantō; the landing places of the cables are marked by beacons, and anchorage is prohibited on the line joining these beacons. The northern end of this cable is carried overhead from the northern side of Sankaku tō to the eastern end of Mokuho.

Tidal streams.—From observations made in the autumn, it appears that the tidal streams in the middle of the harbour, at spring tides, turn about 50 minutes after high water and low water; the time of the turn is, however, considerably affected by the state of the Eizan kō, and at times it has occurred before high and low water.

South-westward of Sankaku tō the tidal streams are irregular owing to the water coming out of the channel between this island and the town.

Directions.—Mokuho kuchi should be approached from Teito kai on an east-south-easterly course, as given in the Directions on page 443, so as to avoid the shoals lying about one mile westward of the northern extremity of Kagen hantō. Directly after passing through Mokuho kuchi vessels should turn sharply northward, rounding the south-east point of Tatsuri tō fairly close to, and bringing a conspicuous sharp peak, 234 feet (71m3) high, situated on the south-east point of Okai tō, in line with the south point of Chōsa tō, bearing about 026°; this mark leads through the channel along the eastern side of Tatsuri tō in a least depth of about 5½ fathoms (10m1). Thence proceed along the east coast of Chōsa tō until Nan kaku, on which is a beacon, bears about 115° and is open north-eastward of Ryūtō, when turn eastward, passing northward of the light-buoy moored off the northern end of the shoals between Ryūtō and Chōsa tō; a mid-channel course may then be steered for the anchorage.

During strong southerly and easterly winds there is an eddy in the opposite direction through Mokuho kuchi and off Ryūtō (*Lat. 34° 47′ N., Long. 126° 21′ E.*), which makes a vessel difficult to handle. About a mile seaward of Mokuho lighthouse the rate of the tidal streams during spring tides at the middle of the ebb tide is about 9 knots; under these conditions it is dangerous to close the northern extremity of Kagen hantō before altering course to pass through Mokuho kuchi, and it is better to steer for the middle of the entrance when about a mile off. After passing through Mokuho kuchi, when this happens about the middle of the flood stream, vessels should not alter course too suddenly when rounding the south-east point of Tatsuri tō; if the turn is made too sharply the vessel, owing to the check in her speed and the eddy, may not answer her helm when put the other way, and her head may be gradually driven dangerously near the south-eastern extremity of Tatsuri tō. In addition the vessel may be carried towards this point by the reverse stream setting south-westward through the channel eastward of Tatsuru tō (*see* Tidal streams on page 447).

Charts 913, 3365, 104, 3480, 1262.

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Chart 1558, plan of Mokuho kō.

A vessel making for the harbour during the flood tide will encounter the tidal stream coming through Nakano kuchi when off the south point of Chōsa tō, and her head may swing to starboard, but it is advisable not to give her any helm to counteract this, as this stream is only felt over a width of about a quarter of a cable, and, as her bows emerge from it the vessel will naturally swing to port. When the ebb tide is running no such precaution is necessary, but at such a time the vessel must take care not to be set on to the light-buoy between Chōsa tō and Ryūtō, or on to the latter point, when making the turn into the harbour.

With due attention to the tidal streams, the harbour can be entered at night.

Pilotage.—Pilotage is optional. A pilot can be obtained by wireless. The usual places where he boards vessels are: In the northern channel, off Dai-Rōroku tō; in the southern channel, off Kasa tō; in the eastern channel, off Kainan kaku.

Berthing signals.—The following berthing signals are made from the signal station in the Customs compound, situated in the south-eastern part of the town, for vessels intending to berth at the pontoon in that vicinity:—

Day signal	*Night signal*	*Signification*
The vessel's House flag and a yellow cylinder	A *white* light below a *red* light	Berth on the northern side
The vessel's House flag and a red triangle	A *red* light below a *white* light	Berth on the southern side
Two red balls	Two *red* lights, disposed vertically	Berthing not permitted.

The day signals are hoisted at the right yardarm of the flagstaff; in addition to the House flag, the vessel's distinguishing signal in the International Code of Signals may be hoisted at the left yardarm.

Harbour facilities.—Fresh provisions are plentiful. Water can be delivered by water-boats.

A moderate stock of coal is maintained, and can be loaded from lighters at the rate of about 500 tons per day. Fuel oil can be delivered from oil-tanks to vessels at anchor.

There are several pontoons, and one of these, 341 feet (103m9) in length, can accommodate a vessel of 2,000 tons alongside. There are several piers.

Mokuho is connected to the general railway system. There is frequent steamer communication with Shanghai, Dairen, and Japan. The town is connected to the telegraph and telephone system, and there is a W/T station (*see* page 42).

There are some small hospitals, including a zymotic hospital, at Mokuho. There is a quarantine station.

Local storm signals, classes 1, 2 and 3 are displayed; *see* page 38.

Trade and shipping.—The principal exports are rice, cotton, and edible seaweed; imports are fertilisers, flour, cotton goods, artificial silk, sugar, cement, coal and timber.

In 1934, 7,199 steam vessels, with a total tonnage of 899,382 tons, entered the port.

Town.—Mokuho has the usual modern services and equipment, and is the administrative centre of the province. The population in 1935 was 60,734.

Charts 913, 3365, 104, 3480, 1262.

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Chart 913.

COAST.—For about 20 miles northward of Mokuho (*Lat. 34° 47′ N., Long. 126° 23′ E.*) and north-eastward of Mentō suidō, the coast is fronted by a vast mud bank, which dries; this bank is intersected by channels, some of which are used by small vessels with local knowledge, and there are numerous islands on it. Jinshi tō and the other islands bordering the northern approach to Mokuho have been described on pages 443, 444.

Suitō suidō.—Suitō suidō (Su To channel), the channel between Jinshi tō (page 444) and the islands eastward and south-eastward, is encumbered with islets and rocks, especially in the southern part, but there are deep passages between them. Sui (Su) tō, in the middle of the channel, has a conspicuous pointed summit, 566 feet (172^{m}5) high; a bank, with depths of less than 3 fathoms (5^{m}5), extends nearly 1½ miles northward from Sui tō. Vessels can pass either side of Sui tō, but vessels using the western channel must pass between a rock, which dries, lying about 1½ miles northward of Sui tō, and the bank extending northward from that islet. A conical islet, 60 feet (18^{m}3) high, lies nearly 1½ miles north-north-eastward of Sui tō, and a rock, which dries, lies about a cable southward of the former. Manshi tō lies nearly 2½ miles north-north-eastward of Sui tō, and Shō-Manshi tō lies about three-quarters of a mile westward of Manshi tō; there is a conspicuous group of trees on the summit of each of these islets. A rock, which dries 3 feet (0^{m}9), lies about half a mile northward of Shō-Manshi tō and about 2 cables off the western shore of Suitō suidō; a rock, 6 feet (1^{m}8) high, lies about a quarter of a mile south-eastward of the north-east point of Jinshi tō.

Ogi tō is an island lying on the eastern side of the northern entrance of Suitō suidō, and has two hills on it, connected to each other by lower land; the western and higher hill is bare and 247 feet (90^{m}5) high, whilst the eastern is wooded. There is a bay on the southern side of Ogi tō, but it dries out entirely. There is no passage between Ogi tō and the islands and banks south-eastward.

The tidal streams in Suitō suidō run northward with the rising tide, and southward with the falling tide, turning at about high water and low water at Anba tō. On the western side of the channel the north-going stream attains a rate of about 3 knots, and the south-going stream about 4 or 5 knots.

Kanhei wan.—Rinsui hantō (Imu chui peninsula) is a narrow peninsula, very indented, which extends about 10 miles in a north-westerly direction from the coast about 15 miles northward of Mokuho. This peninsula forms the south-western side of Kanhei wan (Hampyon bay).

The entrance to Kanhei wan can be approached by vessels with local knowledge from Suitō suidō or by the channel close along the northern side of Jinshi tō, which is bounded northward by Rakugetsu satai and Kakuji satai, described on page 452. After passing the northern side of Ogi tō the channel leads eastward between mud banks, which dry, on either side. The entrance to Kanhei wan, immediately northward of the north point of Rinsui hantō, is obstructed by islets and shoals, but within these there are depths of from 5 to 10 fathoms (9^{m}1 to 18^{m}3) for a distance of about 3 miles; the head of the bay is shoal, and there are several rocks in it. The shores are fringed by extensive mud banks, which dry, and it should only be entered by small vessels with local knowledge.

Charts 104, 3480, 1262.

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Chart 913.

Ka-on tō lies with its southern extremity about 7 miles north-eastward of Ogi tō and on the extensive mud flat which extends from the coast on the northern side of the entrance and continues for 5 miles south-westward from the western side of this island; its summit, at the southern end of the island, is a conspicuous, sharp, rocky peak, 677 feet (206m3) high. Cho tō, about half a mile north-westward of the north point of Rinsui hantō and on the southern side of the entrance to Kanhei wan, is an islet 84 feet (25m6) high, with a conspciuous clump of trees on its northern side. Kanhō san, at the head of the bay and about 10 miles south-eastward of Cho tō, is a conspicuous reddish peak, 848 feet (258m5) high.

The tidal streams in the entrance to Kanhei wan attain a rate of 2¼ knots, but they are weak inside the bay.

Islets and banks northward of Jinshi tō.—Up to a distance of about 8 miles north-westward of the north-east point of Jinshi tō are a number of sand ridges, some of which dry, running more or less parallel to each other in a north-east and south-west direction; there are several islets on these ridges. All these banks and islets lie on the northern side of the western approach to Kanhei wan; those on the southern side have been described with the northern approach to Mokuho on page 443.

Kakuji satai (Kakuri bank), the outermost bank, lies with its south-western extremity about 3 miles north-westward of the north-west point of Jinshi tō; from this position it extends about 14 miles in a north-easterly direction, with general depths of less than 3 fathoms (5m5), whilst a large portion of it dries. The south-eastern side of this bank is steep-to; a detached shoal, with a depth of 1¾ fathoms (3m2) over it, lies close off the south-western extremity.

Several islets lie on the north-western side of Kakuji satai. Shoji (Songui) tō, the largest of these, lies about 7½ miles northward of the north-east point of Jinshi tō, and its northern side is steep-to; there are some dwellings on a shingle spit on its south-east coast. A rock, which dries 10 feet (3m0), lies about one mile north-eastward of the north point of the island. There are several rocks and islets eastward of Shoji tō, the positions of which can best be seen on the chart.

Kakuji (Teikakuri) tō lies about 2¼ miles south-westward of Shoji tō, and has a clump of trees on its north-eastern end. A precipitous islet, 156 feet (47m5) high, lies on a sandbank which extends a short distance from the northern side of Kakuji tō, and about 3½ cables farther northward is a rock 28 feet (8m5) high. Shō-Kakuji tō (*Lat. 35° 15′ N., Long. 126° 07′ E.*) lies about 6 cables north-eastward, and Kakukyo tō lies about half a mile north-westward of Kakuji tō; both these islands are cliffy.

Rakugetsu satai (Nakuoru bank) runs parallel to and about 2 miles south-eastward of Kakuji satai, and dries over a considerable portion; both sides of this bank are steep-to. Jō-Rakugetsu tō and Ka-Rakugetsu tō lie on a mud bank, which dries, about midway between Rakugetsu satai and Kakuji satai. Jō-Rakugetsu tō is the north-eastern of these two islets, and has two summits of about the same elevation; there is a shingle beach on its southern side, with some dwellings on a hill behind. Ka-Rakugetsu tō also has two hills on it, the northern, which is covered with pine trees, being slightly the higher; there are some dwellings on a shingle beach on its eastern side.

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A rock, 8 feet (2m4) high, lies about 3 cables westward of Ka-Rakugetsu tō. Vessels bound for Kanhei wan from the westward pass between the south-western extremity of Rakugetsu satai and the bank, on which are several rocky islets, extending from the north-western side of Jinshi tō.

Eastward and parallel to Rakugetsu satai is a chain of four islets; Kokai tō, the south-western of these, is 104 feet (31m7) high and lies about 2 miles north-eastward of the north-east point of Jinshi tō. The two middle islets lie on the edge of the coastal bank and are covered with grass; the north-eastern islet, which is flat-topped, cultivated, and 97 feet (29m6) high, lies on the edge of the drying part of the coastal bank which extends south-westward from Ka-on tō.

Off-lying islands.—Anchorage.—Anba guntō (Amma group) consists of seven islets, the largest of which, named Anba tō, lies about 5¼ miles north-westward of Shoji tō; the coasts of most of these islets are cliffy, with a few sandy beaches. There are three villages in the group. A conspicuous clump of pine trees stands on the northern side of the summit of Anba tō.

Chiku tō lies close off the north-west point of Anba tō and is connected to it by a rocky ledge; it has two peaks, the eastern being 254 feet (77m4) high, and there is a group of pine trees on the western. Go tō lies close off the south-west point of Anba tō, and Kō tō lies close south-westward of the former; a rock, awash at high water, lies off the southern extremity of Kō tō. Ō tō, 305 feet (93m0) high, lies close off the north-west point of Go tō.

Anba tō anchorage is enclosed by the western side of Anba tō, and by Chiku tō, Ō tō, and Go tō; it is sheltered from all winds except those between north-north-west and west-south-west. There are no dangers, except a rock, which dries 2 feet (0m6), lying close off the northern side of Ō tō and on the southern of the entrance. The anchorage is in a depth of 5¼ fathoms (10m5), mud, with the eastern peak on Chiku tō bearing 000°, distant 9 cables. The inner part of the anchorage is divided into two bays by a promontory on the west coast of Anba tō, and small vessels with local knowledge can anchor in either of them.

Sekiman tō lies about one mile north-eastward of the northern extremity of Anba tō, and is cliffy on its northern side, while its southern side consists of cliffs and shingle beaches. Shō-Sekiman tō lies close south-eastward of Sekiman tō, with shoal water between, and there is a somewhat conspicuous group of pine trees on its summit; a rock, 64 feet (19m5) high, lies close southward of Shō-Sekiman tō. The channel between Anba tō and these two islets has depths of from 4 to 8 fathoms (7m3 to 14m6), but two rocks, 60 feet (18m3) and 50 feet (15m2) high, respectively, lie in the north-western entrance, and a rock, which dries 16 feet (4m9), lies in the middle of the south-eastern entrance.

Sōri jo (*Lat. 35° 23′ N., Long. 126° 05′ E.*), a rock 50 feet (15m2) high, and Gyūkaku sho, 53 feet (16m2) high, lie about 1½ and 2 miles, respectively, north-eastward of Sekiman tō, and between these two rocks is a smaller rock, 9 feet (2m7) high. Dairoku tō, 112 feet (34m1) high, is a rocky islet of a reddish colour lying about 3¼ miles eastward of Sekiman tō, and Ōtō jo lies about half a mile southward of Dairoku tō and is connected to it by a reef; a rock, about 3 feet (0m9) high, lies about three-quarters of a mile eastward of Ōtō jo.

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Tidal streams.—In the vicinity of Anba guntō the tidal streams set north-eastward with the rising tide, with a maximum rate of from one to 2½ knots, and south-westward with the falling tide, with a maximum rate of from one to 2½ knots, and south-westward with the falling tide, with a maximum rate of from one to 3½ knots; there is slack water for about 10 minutes at approximately the times of high and low water.

The tidal streams are weak in the channel between Anba tō and Sekiman tō, and strong outside the latter and along the south-east coast of Anba tō. Near the western ends of Ō tō and Chiku tō the tidal streams are somewhat stronger, a rate of from 2 to 2¾ knots having been experienced.

Coast.—For about 3 miles northward of Ka-on tō (page 452) there is a low stretch of land, but it then rises abruptly to peaks of over 1,000 feet (304m8). An islet, 59 feet (18m0) high, lies close to the coast about 5½ miles north-eastward of the northern extremity of Ka-on tō; mud flats, which dry, extend about 3 miles offshore between the northern side of the entrance to Kanhei wan and this islet. A rock which dries 10 feet (3m0), lies close off the edge of these flats and about 2 miles west-north-westward of the north point of Ka-on tō.

Shichisan tō (Chirusan) consist of several rocky islets lying on the edge of the coastal bank and westward of the 59-foot (18m0) high islet; they are all covered with grass, and the northernmost, 112 feet (34m1) high, lies nearly 5 miles westward of this islet. Vessels should never attempt to pass along the coast southward of the line joining the north point of Shoji tō and the northern Shichisan tō.

Hōseiho kō.—About 2½ miles northward of the 59-foot (18m0) islet is the entrance to a creek, which divides into two branches about 1½ miles up. Byō tō, an islet 116 feet (35m4) high, lies in the middle of the entrance; Dō-onsho tō, 258 feet (78m6) high, lies on the southern side of the entrance, and So tō, a rock 44 feet (13m4) high, on the northern side.

The north-eastern branch of the creek is very shallow, and dries across its entrance. The south-eastern branch is named Hōseiho kō, and dries except for a narrow channel about half a cable wide; it is used by small local craft. Kyūshū ri is a small village on the southern side of the entrance to Hōseiho kō, and Hōsei ri (Popusompu) is a large village on the northern side of the harbour. Storm signals, class 1, are exhibited at Hosei ri; *see* page 38.

Dō-onsho tō (*Lat. 35° 22′ N., Long. 126° 24′ E.*) has a somewhat pointed summit and is easily identified by vessels making for the harbour; a sharp, wooded peak, 922 feet (281m0) high, situated on the northern side of the creek, is a conspicuous mark, and Shinyō san, situated at the head of Hōseiho kō and 784 feet (239m0) high, can be seen from the entrance. Vessels bound for Hōseiho kō can pass northward of Byō tō, or between this islet and Dō-onsho tō; the latter islet lies on the edge of a bank, which dries, extending from the southern side of the entrance.

Dangers.—In 1919, the *Shinshei maru* reported a shoal, with a depth of less than 6 feet (1m8) over it, about 3 miles north-westward of Dō-onsho tō.

A shoal, with a depth of 4¾ fathoms (8m7) over it, lies about 7 miles north-westward of Dō-onsho tō; the bottom is sand and mud, and there is frequently a heavy ground swell in this vicinity.

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Satsuho naiho.—Satsuho naiho (Chupponeikaye) is an inlet which has its southern entrance point about 9½ miles north-north-eastward of Byō tō; the entire inlet dries, except for a channel about half a mile wide, with depths of from 2 to 3 fathoms (3m7 to 5m5), along its northern side. A bar, with depths of from 4 feet (1m2) to 3 fathoms (5m5), lies off the entrance to the inlet; just within the entrance is a deep hole, about 1½ miles in length, with depths of 7 fathoms (12m8).

Chiku tō (Tei somu) is an islet, covered with grass, lying about one mile northward of the southern entrance point of Satsuho naiho, and another islet lies about 2 cables southward of Chiku tō; these two islets lie on the western edge of the broad sandbank extending from the southern side of the inlet. A rock, which dries 3 feet (0m9), lies about 2 cables westward of Chiku tō. Miyo tō, an islet 61 feet (18m6) high, covered with grass, lies about 1¾ miles westward of Chiku tō and on the western edge of the bar; it is surrounded by reefs, and a rock, 18 feet (5m5) high, lies about 2 cables westward of it, whilst a rock, which dries 12 feet (3m7) lies about 3 cables southward of the islet. Ken tō (Soragu somu), an islet 69 feet (21m0) high, covered with grass, lies close off the northern entrance point of Satsuho naiho.

The channel inside the inlet is marked by fishing stakes on both sides. Chiku tō, an islet 73 feet (22m2) high, lies on the flat on the southern side and about 7 miles east-north-eastward of Miyo tō; a rock, 19 feet (5m8) high, lies about 3 cables northward of this islet, and another rock, 7 feet (2m1) high, lies about three-quarters of a mile north-eastward of the islet. Yuen tō, an islet 73 feet (22m2) high, lies on the northern side of the channel and about 8½ miles east-north-eastward of Miyo tō; about a quarter of a mile south-eastward of this islet, and on the southern side of the channel, is a rock which dries 16 feet (4m9). Saho ri (Yoguto) and Satsuho ri (Chuppo) are two villages at the head of the inlet, but they can only be reached by boats at high water.

The rugged summit of Toshō san, 1,442 feet (439m5) high, situated about 9 miles eastward of Yuen tō, is conspicuous; a peak, 1,115 feet (339m8) high, situated about half a mile southward of this summit, in line with the 7-foot (2m1) high rock about three-quarters of a mile north-eastward of Chiku tō, bearing about 084°, leads up the channel of Satsuho naiho. On the southern side of the inlet are two peaks of the same elevation, 1,450 feet (442m0).

Off-lying islands and dangers.—I (Ui) tō is a hilly island lying with its north-eastern extremity about 7½ miles westward of Ken tō; Bōgetsu hō (*Lat. 35° 36′ N., Long. 126° 19′ E.*), the summit of the island, is a conspicuous blunt peak, 831 feet (253m3) high, situated in the north-eastern part. A sandbank, which dries, extends from 3 to 6 cables from the south-east coast, and Daigaichi tō, a wooded islet 125 feet (38m1) high, lies near the northern end of its outer edge. Several islets and rocks lie within a distance of one mile from the south-western side of I tō. The north-west coast of the island is indented by several bays. In the middle of the north-eastern of these is Seikin tō, an islet 191 feet (58m2) high, with another islet close northward of it; within these islets the bay is entirely occupied by a sandbank which dries. Chin ri is a village at the head of the bay. Shoku (Shiki) tō lies off the entrance to this bay, and consists of two

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hills connected by a low neck; except for the western part of the north coast, this island is surrounded by reefs and rocks up to a distance of 2 cables. Small vessels with local knowledge can obtain anchorage between Seikin tō and Shoku tō, where there is a small area with depths of from 7 to 8 fathoms (12m8 to 14m6).

The passage between I tō and the mainland should not be used except by small vessels with local knowledge; the depths are less than 5 fathoms (9m1), and there are several islets and rocks, the positions of which can best be seen on the chart.

Beijamun yo, about one mile north-westward of the west point of I tō, consists of three rocks close together, which dry 19 feet (5m8). Kaarumuru yo lies about one mile north-eastward of Beijamun yo, and consists of two rocks which dry 8 feet (2m4).

Ka-Ōtō tō (Tei Wantsun) lies about 7 miles westward of Shoku tō and has two peaks, the western and higher of which is wooded; the coast consists of rocky cliffs, but in calm weather landing can be effected in a small bay on the southern and also the northern side of the island. Jō-Ōtō tō (So Wantsun) is separated from the northern side of Ka-Ōtō tō by a deep channel about 6 cables wide. Both these islands are inhabited and are cultivated in parts. Bōkai tō, a rocky islet 208 feet (63m4) high, covered with grass, lies nearly half a mile eastward of the north point of Jō-Ōtō tō, and close northward of Bōkai tō is Hoku gan, a similar islet, 98 feet (29m9) high, with a rock above water off its eastern side. Retsu tō (Observation islet) lies about three-quarters of a mile eastward of Bōkai tō, and is a round-topped islet covered with grass. There are deep channels between Retsu tō and the other two islets, and between the latter and Jō-Ōtō tō.

Coast.—Islets and rocks.—The coast between Ken tō and Suiseidō, a salient, grass-covered point about 2 miles northward, is rocky; Kakuho ri is a small village about midway between these two points, and boats can land here in calm weather. A rock, which dries 2 feet (0m6), lies about half a mile westward of Suiseidō. Seki tō, an islet 66 feet (20m1) high, lies 2¾ miles northward of Suiseidō, and Shodo tō, 106 feet (32m3) high, lies about a quarter of a mile south-westward of Seki tō; there are numerous rocks between these two islets and Suiseidō. Ijō hō (Puan san), situated about 7 miles north-eastward of Suiseidō, is the highest peak in this neighbourhood, and is conspicuous.

The coast between Suiseidō and the entrance to Gunzan kō, about 20 miles northward, is deeply indented, but the entire area is almost entirely occupied by flats which dry, on which are some islets. Higan (Pian) tō lies about 5½ miles northward of Suiseidō and on the outer edge of the coastal bank; it has three peaks, the northern and highest of which is 622 feet (189m6) high. There are shingle beaches on the eastern and western sides of the island, but elsewhere the coasts consist of rocky cliffs; there is a village on the eastern side. Four islets lie close off the eastern side of Higan tō.

Kokunzan guntō.—Light.—Kokunzan guntō comprises several islands lying in two chains, separated by a channel about one mile wide running in an east and west direction; Fujo (Mokami) tō, the southernmost island of the group, lies about 3 miles north-north-westward of Higan tō. All the islands have more or less bare and precipitous hills on them.

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Yami tō (*Lat. 35° 51′ N., Long. 126° 30′ E.*), the easternmost island of the southern chain, lies about 6 miles north-north-eastward of Higan tō, and has a conspicuous rounded summit 508 feet (154m8) high; there is a wood on the southern slope of this hill, and a village below it. Shō-Yami tō lies close westward of Yami tō, and there are a few pine trees on the southern side of its summit, which is situated in the eastern part; the western part is a low flat-topped hill covered with grass. A rock, 33 feet (10m1) high, lies about one cable westward of the western extremity of Shō-Yami tō, and about half a cable south-westward of this rock is a small rock 2 feet (0m6) high.

Shinji tō (Unkoru) lies with its eastern extremity nearly 1½ miles southward of Yami tō; it is the largest island of the southern chain and is indented by many bays. This island is nearly divided into two parts, the connection being a narrow strip of shingle; the bay on the southern side of this shingle strip, like the others, is entirely filled by a bank of sand and mud, which dries. The eastern part of the island has two peaks of almost the same elevation, Kanen hō, the southern, 642 feet (195m7) high, being slightly the higher of the two; Daikaku san, 613 feet (186m8) high, the summit of the western part, is a conspicuous sharp peak.

Fujo (Mokami) tō lies close south-westward of Shinji tō and has a few trees on it. Bujō hō, the summit of the island, is situated in the south-western part and is 424 feet (129m2) high; it is conspicuous from the westward. A mud flat, which dries, and on which are several rocky islets, extends some distance from the northern side of the island. There is a deep gully, fully half a mile broad, along the southern side of Shinji tō and Fujo tō.

Senyū (Muiin) tō lies close north-westward of Fujo tō and consists of two parts connected by a narrow strip of sand about half a mile in length. The summit of Nan tō, the southern part, is a bare, rocky peak 359 feet (109m4) high; Chin ri and Tō ri, the two principal villages of the group, are situated in Nan tō. The summit of Hoku tō, the northern part, is 489 feet (149m0) high; the western extremity of Hoku tō is a thickly wooded, isolated hill, and a rock, 20 feet (6m1) high, lies about one cable westward of it. The bays on either side of the sandy strip connecting the two parts of Senyū tō are occupied by flats which dry.

Sōshi tō lies close westward of the southern part of Senyū tō and is 115 feet (35m0) high. Dai-Chō tō lies close northward of Sōshi tō and is connected to it by a reef which dries; its summit is a bare, rocky peak 452 feet (137m8) high. Foul ground extends about 3 cables westward from these two islands.

All the islands just described lie at the south-western end of a tongue of the coastal bank which extends from the mainland north-eastward.

Kanshi (Kochi) tō, the westernmost island of the southern chain, is separated from Sōshi tō and Dai-Chō tō by a channel about 3 cables wide between the banks extending from either side; its summit, near the centre of the island, is 443 feet (135m0) high, and the northern extremity of the island is a conspicuous wooded peak, 223 feet (68m0) high. The west coast is precipitous and steep-to. The channel between Kanshi tō, Sōshi tō and Dai-Chō tō has a least depth of 7 fathoms (12m8) in the fairway; Koru sho, a rock which dries 9 feet (2m7),

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Chart 913.

lies in the middle of the northern entrance, and vessels should pass eastward of it. A rock, 19 feet (5m8) high, lies about a quarter of a mile northward of the northern extremity of Kanshi tō.

Kei tō (*Lat. 35° 51′ N., Long. 126° 27′ E.*), at the eastern end of the northern chain of Kokunzan guntō, lies about 1¼ miles west-north-westward of Shō-Yami tō and is a rocky islet, 105 feet (32m0) high, covered with grass. A reef extends from one to 2 cables from its eastern and southern sides, and a rock, which dries 21 feet (6m4), lies on the eastern part of this reef.

Ōkyō tō (Pikkyon) lies with its eastern extremity nearly three-quarters of a mile west-north-westward of Kei tō; its summit, situated near the eastern end, is 269 feet (82m0) high. A reef extends about half a mile south-eastward from the eastern extremity of Ōkyō tō, leaving only a narrow boat passage between its outer end and Kei tō. Shō-Ōkyō tō lies close westward of Ōkyō tō, and there is no passage between.

Bōchiku (Panjiku) tō, which has a peaked summit, lies westward of Shō-Ōkyō tō, and is separated from it by a passage about 2 cables wide, with a least depth of 19 fathoms (34m7) in the fairway; this passage is navigable for vessels with local knowledge, but the tidal streams may attain a rate of 3 knots and there are tide rips. The western extremity of Bōchiku tō is known as Kōdai tō, but it is in reality a peninsula connected to the main island by a narrow neck of land.

Mei (Porugunnurii) tō, which also has a peaked summit, lies close westward of Kōdai tō and is connected to it by a ledge which dries. A small rock, 10 feet (3m0) high, lies close off the north-east point of Mei tō, and a 1¼-fathom (2m3) patch lies about a quarter of a mile south-eastward of this rock. Sorupun sho, a rocky ledge which dries 17 feet (5m2), lies about half a mile northward of the north-east point of Mei tō, and there is foul ground for about a quarter of a mile around it. Mei tō, as well as the islands in the northern chain eastward of it, is cliffy, devoid of trees, and uninhabited.

Honō tō lies about 2 cables westward of Mei tō, and is a wooded islet with cliffy coasts. There is a least depth of 3½ fathoms in the channel between Honō tō and Mei tō.

Matsu (Taruno) tō, the westernmost island of the group, is separated from Honō tō by a narrow passage only suitable for boats. A rocky ledge, with two islets on it, extends about a quarter of a mile southward from the west point of the island. A village, with a clump of trees on either side, is situated at the head of a small bay on the south coast of Matsu tō.

A light is exhibited, at an elevation of 177 feet (53m9), from a white octagonal concrete tower on a dwelling, 35 feet (10m7) in height, situated on the western extremity of Matsu tō.

Anchorage.—Tidal streams.—Anchorage, sheltered except from westerly winds, can be obtained in the channel between the northern and southern groups of Kokunzan guntō. The western entrance is free from dangers, but the eastern entrance is too shoal to be used except by small vessels. The best positions for anchoring are about 4 cables southward of the western end of Ōkyō tō, and about the same distance off the middle of the southern side of this island; the depths here are about 8 fathoms (14m6).

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The tidal streams in this channel run eastward with the rising tide, and westward with the falling tide, the maximum rate being from one to 2¾ knots. Outside the group the tidal streams set northward and southward.

Outlying islets.—Koku tō (Komu somu) lies about 7 miles westward of Matsu tō, and is a bare islet with a pointed summit; a rock above water lies close off its western side.

Shoku (Chiku) tō lies about 4½ miles west-north-westward of Koku tō, and is a precipitous rocky islet with a sharp summit; Piyomu (*Lat. 35° 53′ N., Long. 126° 04′ E.*), a bare rock, lies about 2 cables westward of Shoku tō, with a rock, which dries, between them. Buoys with red flags, used by fishermen, are stated to be found southward of Shoku tō and Koku tō.

Jūni tōha (Yorutsudompa) tō is a group of about a dozen uninhabited islets, the south-eastern of which is 91 feet (27^{m}7) high and lies about 8 miles north-westward of Matsu tō. These islets, except the southernmost, lie on a horsehoe-shaped reef, forming a bay open northward, in which there is a depth of 8 fathoms (14^{m}6).

GUNZAN KŌ.—Gunzan (Kunsan) kō is the anchorage off the city of Gunzan, which is situated on the southern side of the mouth of the Kin (Kunsan) kō and about 14 miles north-eastward of Yami tō (page 457). It is an open port, and, being the only port for the vast fertile areas in the neighbourhood, it has rapidly achieved prosperity.

The anchorage is well sheltered from wind and sea, but, owing to the silt brought down by the Kin kō, the depths in it and in the approach channel are continually changing, especially when the river is in spate, and it is advisable to employ a pilot; in 1934 vessels with a draught of 20 feet (6^{m}1) could reach the anchorage. There are three pontoons off the embankment fronting the city, and a vessel of 3,000 tons can lie alongside each of these. A large sandbank, which dries and has several islets on it, lies off the entrance to the Kin kō; the channel southward of this bank is the one generally used by shipping, and it is buoyed and lighted.

Southern channel.—Islets and landmarks.—Hiyō (Piun) tō is the outermost island on the southern side of the main channel leading to Gunzan kō; it lies about 6 miles north-north-eastward of Yami tō and close off the edge of the drying portion of the coastal bank which forms the southern side of that channel. Hiyō tō is brown-coloured and conspicuous; a small village stands on its eastern part. A rocky islet, 30 feet (9^{m}1) high and covered with grass, lies about 4 cables eastward of Hiyō tō.

Mei gan (Baruku nyo) is a group of two large and several small rocks lying off the western end of the large bank, which dries, separating the north and south channels; the largest rock, 28 feet (8^{m}5) high, lies at the eastern end of the group and about 2 miles northward of Hiyō tō. A shoal, with depths of less than 3 fathoms (5^{m}5), extends fully 2 miles south-westward from Mei gan, and forms the northern side of the entrance to the southern channel.

Oshiki (Youjiku) tō, nearly 1½ miles north-eastward of Hiyō tō, lies on the edge of the flat which forms the southern side of the southern channel; it has a brown-coloured hill, 239 feet (72^{m}8) high, at its western end, and there are two groups of pine trees on the western

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Chart 913.

side of this summit; there is another hill, 118 feet (36^{m}0) high, with a conspicuous clump of trees on its summit, at the eastern end of the island, and there is a village on the northern side of this hill. Ka tō, 110 feet (33^{m}5) high, lies about 4 cables south-westward of Oshiki tō, and Ga tō, 149 feet (45^{m}4) high, lies about half a mile southward of the eastern end of Oshiki tō. Naisō tō (Sei somu) lies about half a mile south-eastward of Oshiki tō, and there is a small village on it. There is a narrow, shallow boat passage through the coastal bank between Naisō tō and Ga tō. Chōsan tō, an islet 83 feet (25^{m}3) high, lies about 1½ miles north-north-eastward of Naisō tō and on the edge of the coastal bank which forms the southern side of the southern channel. Kadai tō are two islets almost joined together; the southern lies about half a mile south-eastward of Chōsan tō and is 74 feet (22^{m}6) high, with a single tree on its summit. Nyuji tō, 59 feet (18^{m}0) high, lies about 1½ miles eastward of Chōsan tō, and has a large tree, encircled by bamboos, on its summit.

Hōka rei, a sharp peak 443 feet (135^{m}0) high, is situated on the coast about 4 miles eastward of Chōsan tō; it is the highest hill in this locality and is easily identified. Zenbō san (*Lat. 36° 00′ N., Long. 126° 40′ E.*), the rocky northern entrance point to Gunzan kō, is situated about 2 miles north-westward of Hōka rei and is 311 feet (94^{m}8) high; there is a large white chimney on its summit. Kōbō san, a sharp, rocky peak 236 feet (71^{m}9) high, is situated about half a mile north-eastward of Hōka rei.

Dangers.—Lights and buoyage.—No. 1 buoy is a light-buoy, painted black, exhibiting a *white flashing* light *every three seconds*, moored about one mile westward of Hiyō tō; it marks a shoal with a depth of 2½ fathoms (4^{m}6). This buoy is liable to drift, and some time may elapse before it is replaced in position.

A light is exhibited, at an elevation of 36 feet (11^{m}0), from a red stone column situated on a rock, which dries 9 feet (2^{m}7), lying nearly half a mile westward of the north-west point of Oshiki tō; between this rock and the island is a rock which dries 22 feet (6^{m}7).

No. 2 buoy is a light-buoy, painted red, exhibiting a *white flashing* light *every three seconds*, moored about 7 cables north-eastward of the north-west point of Oshiki tō; it marks a shoal which lies on the southern side of the fairway.

No. 3 buoy is a black conical buoy, surmounted by a cylinder, moored on the southern side of a rock, which dries one foot (0^{m}3), lying about one mile north-eastward of the north-west point of Oshiki tō.

No. 5 buoy is a black conical buoy, surmounted by a triangle, moored about 1½ miles north-eastward of the north-west point of Oshiki tō; it marks a shoal, with a least depth of 2½ fathoms (4^{m}6), lying on the northern side of the fairway. On the southern side of the fairway, and between this buoy and Oshiki tō; is a detached bank, which is reported to dry over a length of about one mile in an east and west direction.

A light is exhibited, at an elevation of 33 feet (10^{m}1), from a red conical stone structure, 48 feet (14^{m}6) in height, situated on a rock which dries 14 feet (4^{m}3) lying about 2 cables north-westward of Chōsan tō; there is foul ground between this rock and Chōsan tō.

No. 4 buoy is a red conical buoy, surmounted by a triangle, moored on the northern side of a rock, which dries one foot (0^{m}3), lying about

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Chart 913.

6 cables east-north-eastward of Chōsan tō and on the southern side of the fairway.

A light is exhibited, at an elevation of 24 feet (7m3), from a red circular stone beacon, 36 feet (11m0) in height, situated on a rock about 4 cables north-north-westward of Nyuji tō.

A light is exhibited, at an elevation of 36 feet (11m0), from a black circular concrete beacon, 52 feet (15m8) in height, situated on a rock lying about 3 cables south-eastward of Zenbō san.

No. 7 buoy is a black conical buoy, surmounted by a cylinder, moored nearly one mile south-eastward of Zenbō san and on the southern side of a large shoal lying on the northern side of the fairway. No. 9 buoy is a light-buoy, painted black, exhibiting a *white flashing* light *every three seconds*, moored off the eastern end of this shoal in a position about half a mile north-westward of Dō matsu, the point at the north-western end of the city of Gunzan.

A light is exhibited, at an elevation of 29 feet (8m8), from a circular concrete structure, 36 feet (11m0) in height, painted red and black in horizontal bands, situated on Minya gan (*Lat. 35° 59′ N., Long 126° 43′ E.*), a rock lying close off the city of Gunzan and about 8 cables east-south-eastward of Dō matsu.

In 1936 the *Yesoru maru* grounded about half a mile north-westward of Minya gan, and it is stated that there are patches which dry from one to 2 feet (0m3 to 0m6) in this vicinity. In 1937, a reef lying within a distance of 2 cables from Minya gan was being removed, and anchorage in this locality was prohibited.

Northern channel.—Islets and dangers.—Chiku tō lies about 5 miles northward of Hiyō tō and on the northern side of the entrance to the northern channel; a reef, which dries, extends about 3 cables south-westward from the western extremity of Chiku tō, and on the outer end of this reef is Chi tō, a small islet 88 feet (26m8) high. A black rock, 47 feet (14m3) high, lies about half a mile westward of Chiku tō, with foul ground between.

Kaiya tō lies about 4 cables eastward of Chiku tō and has some conspicuous trees on its summit; foul ground extends about 6 cables from its northern side and 3 cables from its western side, and it is connected to the mainland eastward by a sandbank which partly dries. Some rocks, which dry, lie from 3 to 5 cables southward of Kaiya tō.

As the northern channel can only be used by small vessels with local knowledge, no further description of it will be given.

Anchorage.—Directions.—Anchorage can be obtained off the city of Gunzan, in an area about 1½ cables wide between No 9 buoy and Minya gan; the depths are from 3½ to 5 fathoms (5m9 to 9m1), except for a small shoal, with depths of 2½ fathoms (4m6), lying about 1½ cables off the pontoons off the city.

If circumstances permit, vessels should enter the channel when it is high water at Gunzan kō, thus anchoring when there is a certain amount of ebb stream. If there is a heavy swell it is dangerous for vessels exceeding a draught of 15 feet (4m6) to attempt to pass through the channel.

Prohibited anchorage.—Submarine cables.—Anchorage is prohibited between a line joining Minya gan light-structure and a beacon on the northern shore about 7 cables north-north-eastward, and a line

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Chart 913.

drawn 236° from this beacon to a position close eastward of the storm signal station ; this does not affect vessels lying alongside the pontoons or making fast to the pier.

Two submarine telegraph cables cross the Kin kō north-eastward of the city and above the harbour limits.

Tidal streams.—Off Oshiki tō slack water at the end of the rising tide occurs about 30 minutes after high water at Chiku tō, and at the end of the falling tide about 50 minutes after low water at that island. In Gunzan kō the flood stream slackens about 50 minutes after high water, and the ebb stream about 1 h. 20 m. after low water at Chiku tō. The flood stream attains its maximum rate, 3 knots, about midway between Zenbō san and Gunzan kō about 3 hours after low water at Chiku tō ; the ebb stream is strongest off the southern side of Yūfu tō (Iubu Somu), situated about three-quarters of a mile north-north-north-westward of Chosan tō, where it attains a rate of 4 knots about 4 hours after high water at Chiku tō (*Lat. 36° 02′ N., Long. 126° 32′ E.*).

In the anchorage off the pontoons at Gunzan kō the flood stream runs for 5¼ hours, with a maximum rate of about 2¼ knots, and the ebb stream runs for 6¼ hours, with a maximum rate of 3¼ knots ; there is slack water for about 15 minutes. For several days after a freshet the ebb stream may run at double its usual rate, and it then runs for a longer period, whilst the flood stream runs with a correspondingly shorter period.

Pilots.—Pilotage is optional. Requests for a pilot can be sent to the agents of a vessel or to the office of the Pilots' Association. They usually board vessels near No. 1 light-buoy ; if, however, there is a strong north-westerly wind the pilot boat usually waits southward of Yūfu tō or near No. 2 buoy, and it is advisable in such case for the vessel to anchor northward of Ushiki tō to allow the pilot to come on board. The pilot boats are black sailing craft with auxiliary motors. Vessels in harbour requiring a pilot should give four long blasts on their whistles.

Berthing signals.—*By day*: Vessels wishing to berth at the pontoons at Gunzan kō must display the signal WPV of the International Code of Signals (meaning " pontoon ") in the fore part of the vessel, where it can be easily seen, when entering the harbour. If permission is granted, the number of the pontoon assigned to the vessel will be indicated by cylinders displayed at the left yardarm (viewed from seaward) of the signal mast at Gunzan as follows :—

One cylinder	No. 1 pontoon.
Two cylinders, disposed vertically.....	No 2 ,,
Three cylinders, disposed vertically.....	No. 3 ,,

When permission is not granted, F flag of the International Code of signals (meaning" no berth vacant") will be hoisted at the right yardarm.

At night: Vessels, other than those of certain Japanese Steamship Companies, wishing to berth at the pontoons, will sound three long blasts on their sirens or whistles.

When permission is granted, the number of the pontoon assigned to the vessel will be indicated by lights exhibited on the signal mast thus:—

One *red* light	No. 1 pontoon.
One *red* light and one *white* light, disposed vertically	No. 2 ,,

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Chart 913.

One *white* light between two *red* lights, disposed vertically ..... No. 3 pontoon.

When permission is not granted, a *green* light will be exhibited at the right yardarm.

Harbour facilities.—Fresh provisions are obtainable; fresh water can be supplied from two 35-ton water boats fitted with pumps.

Only small quantities of coal are available. Fuel oil can be obtained.

Gunzan is connected to the general railway system of Korea. There is steamship communication with Shanghai, Dairen, and various ports in Korea and Japan.

A harbour for fishing vessels has been constructed at the western end of the city, and it is protected seaward by a breakwater about half a mile in length.

Storm signals, classes 1, 2 and 3, are exhibited at Gunzan (*Lat. 35° 59′ N., Long. 126° 43′ E.*); *see* page 38.

Gunzan fu.—Gunzan is a city planned on modern lines, and in 1935 had a population of 41,698; it is connected to the general telegraph system.

Trade and shipping.—Exports include rice, beans, and hides; imports are rice, flour, salt, tobacco, matches, coal and fertilisers.

In 1935, 939 steam vessels totalling 887,098 tons entered the harbour.

Chart 3699.

COAST.—Island and dangers.—Tōhakutei kō (Tompekuchon), about 5½ miles northward of Chiku tō (page 461), is the conspicuous, rocky, southern extremity of a small peninsula which forms the northern and western sides of Hijin wan (Pii-in bay); a considerable portion of this bay dries, and the remainder is very shoal. Bō tō is a wooded islet, 129 feet (39^{m}3) high, lying close off the eastern entrance point of the bay and 2¼ miles eastward of Tōhakutei kō. Between the coast eastward of Chiku tō and Bō tō the coast is fronted by drying flats and foul ground, there being depths of less than 3 fathoms (5^{m}5) as far as 4 miles offshore. There is foul ground off the western side of the peninsula which terminates southward in Tōhakutei kō, and it should not be approached within a distance of 1½ miles.

Yen (Yon) tō lies about 4¼ miles south-westward of Tōhakutei kō and is a useful landmark; its south-eastern extremity is a cultivated plateau. A shoal, with depths of 2½ fathoms (4^{m}6), extends about half a mile from the eastern side of this island, and there is a small village at the inner end of a wooded promontory which extends from about the middle of this side. Anchorage can be obtained, in depths of from 5 to 6 fathoms (9^{m}1 to 11^{m}0), mud, about midway between Yen tō and Tōhakutei kō.

Bējā wan (Beijaa bay) is entered between the north-western extremity of the above-mentioned peninsula, situated about 1¾ miles northward of Tōhakutei tō, and a point about 3 miles north-eastward, and practically dries throughout; it has three inner bays, and the southern of these is almost connected with Hijin wan. Sheltered anchorage, except with winds between south-west and north-west, can be obtained off Bējā wan, in depths of from 5 to 6 fathoms (9^{m}1 to 11^{m}0), mud.

Charts 3480, 1262.

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Chart 3699.

The coast between the northern entrance point of Bējā wan and a point about 8 miles northward, on which is a hill 186 feet (56m7) high, is fringed with sand flats, and rocks, which dry, lie as much as 2 miles offshore in places; Tasurigi amu and the other dangers lying in the approach to Sachō ho (Sajan kaye) are described on page 469. Kōgan ho (Katsupaoi po) and Daisen kō (Poryon po) are two large bays filled with flats which dry; Daisen ri (Hannei) is a village situated at the head of the Daisen kō, the northern of these two bays, and storm signals, class 1, are exhibited here (*see* page 38). Seijū (Poryonsonju) san, situated about 4¼ miles east-north-eastward of Daisen ri, is a sharp and conspicuous peak.

Chart 913.

OFF-LYING ISLANDS.—Osei tō.—Light.—Osei (Ochon) tō is a wooded island lying about 21 miles westward of Yen tō; its coasts are either cliffy or rocky, and are steep-to at a short distance. Dō san, the summit of the island, is situated in the western part. Kashin sho (Pinnacle rock) lies about 3 cables south-eastward of the south-east point of Osei tō and is conspicuous; there is foul ground for about half a cable off the northern side of this rock. *See* view facing page 465.

A light is exhibited, at an elevation of 191 feet (58m2), from a white circular concrete tower, 41 feet (12m5) in height, situated on the north-western extremity of Osei tō (*Lat. 36° 08′ N., Long. 125° 58′ E.*). A fog signal is sounded from the lighthouse.

Storm signals, classes 1, 2, and 3, are displayed at Osei tō light station; *see* page 38.

Anchorage.—Light.—Good anchorage, sheltered from all winds except those between south-south-east and south-south-west, can be obtained in the middle of a bay on the southern side of Osei tō, in depths of from 6 to 8 fathoms (11m0 to 14m6) sand and mud, good holding ground; rocks extend nearly one cable from the western entrance point of the bay, and a rock, which dries 6 feet (1m8), lies about a quarter of a cable off the eastern entrance point, otherwise there are no dangers.

During the summer this bay is a good refuge, as, although it is open to southerly winds, a vessel will ride comfortably; during the winter, however, strong northerly and north-westerly winds cause eddies and raise a cross sea, which causes a vessel to roll and pitch heavily, and in this season it is advisable to moor. Oseitō ri is a fishing village situated in the north-west corner of the bay; a breakwater extends about one cable in an east-north-easterly direction from the shore close southward of the village.

A light is exhibited, at an elevation of 26 feet (7m9), from a black square iron tower, 23 feet (7m0) in height, situated on the head of the breakwater.

Gaien rettō.—Kō tō (Tsurei somu), the westernmost island of Gaien rettō (Oiyonu group), lies about 6 miles northward of Osei tō and is a rocky island devoid of trees. There is a small bay on its north-western side, and a ridge of rocks extends about 8 cables northward from its western entrance point. Ben tō (Cone islet), about 1¼ miles north-eastward of Kō tō, is a conspicuous rocky islet of a light brown colour, covered with grass; a rock, with a depth of 3 feet (0m9) over it, lies about one cable off its north-eastern side, otherwise it is steep-to

Charts 3480, 1262.

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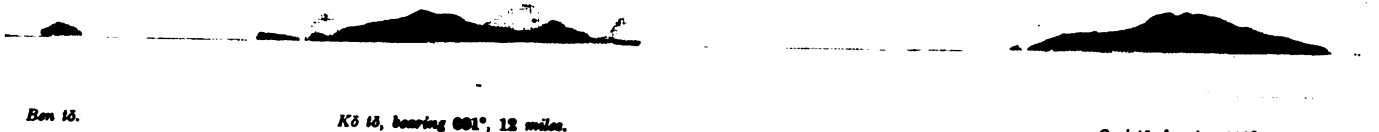
To face page 465.



Gaien retto and Osei tō.

Islets westward of Kancho kaku.

(Original dated 1899).

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Chart 913.

all round. Kō tō and Ben tō are separated from the main group of Gaien retto by a deep channel about 2¼ miles broad; in the southern part of this channel, and about 1½ miles east-south-eastward of Kō tō, is Saijo (Double rock), a steep-to, barren, round-topped islet. *See* view facing this page.

Ōken tō, the south-western island of the main group, lies with its north-western extremity about one mile eastward of Saijo; it has three peaks, the middle and highest being 350 feet (106m7) high. A rocky promontory extends from the middle of the north-east coast, and there is a small village at the head of the northern of the two bays on either side of this promontory. Setsufu sho (Sharp rock) is a pointed, precipitous islet lying about 6 cables south-westward of the north-western extremity of Ōken tō, and there are some low rocks close off its eastern side. Shū-utsu sho is a black rock, 17 feet (5m2) high, lying close off the middle part of the west coast of Ōken tō. A mud flat, which dries, extends about one cable from the western side of the northern end of the island. Foul ground extends nearly 3 cables north-eastward from the north point of Ōken tō, and terminates in a black rock, 6 feet (1m8) high, named Koku sho. Gai-Ōken tō is an islet 131 feet (39m9) high, covered with grass, lying close eastward of the south-east point of Ōken tō; a rocky ledge extends about 2 cables south-eastward from this islet.

Go tō (*Lat. 36° 12′ N., Long. 126° 03′ E.*), the southernmost island of the group, lies about 6 cables south-eastward of Ōken tō; it is barren and uninhabited, and has two peaks, the southern and higher of the two being 308 feet (93m9) high. Gai-Go tō, a round-topped islet 112 feet (34m1) high, lies close off the west point of Go tō, and Higakō, a peaked islet, 138 feet (42m1) high, lies close off the north point. A rock, which dries 17 feet (5m2) lies about half a cable eastward of the south point of Go tō, and Gaihanken sho, a rock which dries 15 feet (4m6), lies about 1¾ cables south-eastward of this rock, with a deep channel between.

Sōbō sho, about 1½ miles eastward of the east point of Go tō, is a black rock 17 feet (5m2) high. A rock with a depth of 4½ fathoms (8m2) over it, is charted about 6½ cables northward of Sōbō sho, but its position is doubtful. Bōba tō, about three-quarters of a mile north-westward of Sōbō sho, is a light-brown rock, 96 feet (29m3) high, with grass on its summit. Seki tō, a flat-topped rock, 29 feet (8m8) high, lies about 3 cables westward of Bōba tō, with a clear passage between.

Gaien tō, the largest island of the group, lies with its south-western extremity about one mile north-eastward of Go tō; its summit, 776 feet (236m5) high, is situated in the eastern part, and another peak, 554 feet (168m9) high, situated on the south-western end of the island, is also conspicuous. The middle part is low and cultivated, and there is a bay, with a sandy beach and a few houses at the head, on the south coast. Dōsangū matsu, a grass-covered islet 193 feet (58m8) high, lies about one cable off the south-western extremity of Gaien tō Kō sho is a bare, reddish-brown rock, 28 feet (8m5) high, lying about 6 cables westward of the west point of Gaien tō. Close off the northern extremity of Gaien tō are two rocks, Yōgan matsu, the outer one, being 88 feet (26m8) high. Foul ground, terminating in a rock with a depth of 2 fathoms (3m7), extends about a quarter of a mile

Charts 3480, 1262.

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Chart 913.

south-eastward from the east point of Gaien tō, and Butsuan tō, a cliffy peaked islet 164 feet (50^{m}0) high, covered with low trees, lies nearly half a mile south-eastward of this point; Sui tō comprises two islets, 101 feet (30^{m}8) and 67 feet (20^{m}4) high, respectively, lying within a distance of half a mile south-eastward of Butsuan tō. Kanchō tō (Cliff islet), nearly 1¾ miles northward of the east point of Gaien tō, is a bare, conspicuous, reddish-brown islet.

Shō-Sei tō, about 4 cables west-north-westward of the north-west point of Gaien tō, is 121 feet (39^{m}9) high and covered with grass, with cliffy coasts; a rock, 12 feet (3^{m}7) high, lies about a quarter of a mile southward of it. Dai-Sei tō, about 1½ cables westward of Shō-Sei tō, with foul ground between, is 427 feet (130^{m}1) high and is covered with grass. with cliffy coasts.

Anchorage.—Directions.—Gaien tō anchorage is the area enclosed by Gaien tō, Dai-Sei tō, Go tō, and Ōken tō, and it can be entered from the north-westward or south-eastward, but the former is preferable; the northern part of this area has moderate depths and a sandy bottom, whilst the southern part is deeper and the bottom is rocky. The anchorage is safe except with winds between west and north-north-west.

Vessels approaching the anchorage from the southward should steer to pass midway between Kō tō and Saijo, and for the west point of Dai-Sei tō when it bears 078°; when the eastern extremity of Ōken tō bears 168°, steer for the 554-foot (168^{m}9) high peak on the south-western end of Gaien tō bearing 114°, and anchor when Kō shō (*Lat. 36° 13′ N., Long. 126° 03′ E.*) bears 152°, in a depth of about 9 fathoms (16^{m}5).

From the northward, vessels should pass about 1½ miles eastward of Ben tō, and steer for the eastern extremity of Ōken tō, bearing 168°, and thence for the 554-foot (168^{m}9) peak on Gaien tō when it bears 114° and as directed above.

With winds between south-west and north-east, through north, sheltered anchorage can be obtained off the southern side of Gaien tō.

Chart 3699.

Islands and dangers north-eastward of Gaien rettō.—Kitsusan rettō is a group of four precipitous islets lying in an east and west direction on a rocky bank. Dai-Kitsusan (Chirumi) tō, the westernmost and largest of this group, lies about 5½ miles north-eastward of Gaien tō and has a conspicuous cliff on its western side; Zoku-Kitsusan tō is a small islet close off its eastern extremity. Chū-Kitsusan tō, about 4 cables eastward of Dai-Kitsusan tō, is 134 feet (40^{m}8) high and has a rock, which dries 8 feet (2^{m}4), close off its southern side. Shō-Kitsusan tō, the easternmost islet of the group, is 131 feet (39^{m}9) high and has depths of from 3½ to 5½ fathoms (6^{m}4 to 10^{m}5) around; the other three islets are practically connected to each other by rocky ledges which dry.

Eastward of Kitsusan rettō, and separated from it by a deep channel about one mile broad, is an extensive shoal with several islands on it. Ko (Ho) tō, the largest island of this group, lies with its southern extremity nearly 1½ miles east-north-eastward of Shō-Kitsusan tō; its summit, 277 feet (84^{m}5) high, is situated in the southern part of the island, and in the northern part is a hill 246 feet (75^{m}0) high, with

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Chart 3699.

pine trees on its summit. There are a few dwellings on the shingle beach at the head of a small bay on the north coast of the island. Meitoku tō, 222 feet (67m7) high, lies about 3 cables off the north-west point of Ko tō, and is connected to it by a rocky ledge which dries. Koku sho, 67 feet (20m4) high, lies on a reef, which mostly dries, extending about 4 cables from the west point of Ko tō. Foul ground, with a rock, 21 feet (6m4) high, on its outer end, extends about a quarter of a mile south-westward from the southern extremity of Ko tō; foul ground, with some rocks which dry, extends about 6 cables south-eastward from the same point.

Ka tō (Noku somu) lies about three-quarters of a mile southward of Ko tō and has two conspicuous groups of trees, the northern being on the summit of the island. A village, the largest amongst these islands, is situated on the southern part of the east coast. Mō tō, an islet 106 feet (32m3) high, is situated close off the west coast, and a rock, which dries 18 feet (5m5), lies about a quarter of a mile south-westward of this islet. A sandbank, with depths of less than 6 feet (1m8) over it, extends as much as half a mile from the eastern side of Ka tō; Seki tō lies on this bank and about 3 cables eastward of the southern end of Ka tō, and a patch, which dries one foot (0m3), lies close northward of Seki tō.

Shō-Kasa tō, about one mile east-south-eastward of the south point of Ka tō, is a small island thickly covered with grass, with a conical summit 283 feet (86m3) high; a rocky ledge, which dries, extends about 4 cables from its western side towards Ka tō, and close northward of this ledge is a rock which dries about 24 feet (7m3). Dai-Kasa (Fukusaku) tō, about half a mile south-westward of Shō-Kasa tō, is precipitous on its south-western side; a conspicuous rock of peculiar shape lies on a rocky ledge which extends a short distance from its south point. A rock, which dries 9 feet (2m7), lies about one cable off the north-west point of the island, and a detached rock, with depths of from 9 to 14 fathoms (16m5 to 25m6) around, lies about 4 cables south-westward of the south point of the island.

During the fishing season, in summer and autumn, numerous fishing nets are laid out on the bank on which these islands are situated; small craft passing between them must, therefore, exercise caution.

U tō (Mondoki tō), about 2½ miles northward of the north-east point of Ko tō, is a conical islet covered with grass. Ushi sho (Yaaton nyo), about 1½ miles west-north-westward of U tō, is an isolated rock which dries 9 feet (2m7).

In the channel between Shō-Kitsusan tō, on the western side, and Ko tō and Ka tō on the eastern side, the tidal streams set northward with the rising tide and southward with the falling tide, the maximum rate being about 2 knots.

Islets and dangers eastward of Kō tō and Ka tō.—Sui tō (Son nyo) is a precipitous, rocky islet lying about 1¼ miles north-eastward of the northern extremity of Ka tō; it is surrounded by a sandbank, which extends as much as 4 cables from its southern side, and there are several rocks, which dry, on it.

Kitsuyō gan and Gaisen tō (Chirume amu) lie together on a bank with depths of less than 3 fathoms (5m5). and are connected to each other by a rocky ledge which dries. Kitsuyō gan, the south-western of the two, lies nearly 1¼ miles east-north-eastward of Sui tō, and is

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Chart 3699.

a black rock 51 feet (15^{m}5) high; Gaisen tō (*Lat. 36° 18′ N., Long. 126° 20′ E.*), nearly half a mile north-eastward of Kitsuyō gan, is an islet 180 feet (54^{m}9) high, covered with grass.

Kō sho consists of four rocks, the south-western of which, named Ka-Kō sho (Norubunyo), lies about 2½ miles south-eastward of Sui tō and dries 20 feet (6^{m}1); Jō-Kō sho, the middle rock, dries 24 feet (7^{m}3); the other two dry 4 feet (1^{m}2) and 11 feet (3^{m}4), respectively.

Butsubo tō (Furumu somu) lies about three-quarters of a mile east-north-eastward of Gaisen tō, and has a group of pine trees in the middle; the coasts are cliffy. A shoal, with depths of less than 6 feet (1^{m}8), extends about 4 cables from the northern side of the islet, and there are several small islets and rocks, which dry, on it. A shoal, with depths of less than 5 fathoms (9^{m}1), extends nearly half a mile from the southern side of Butsubo tō.

Islands northward of Butsubo tō.—Sōshi (Sapuchu) tō lies with its southern extremity nearly one mile northward of Butsubo tō; its summit is situated in the south-western part, and the south-western extremity of the island is a conspicuous white cliff. The south and east coasts are mostly white sandy beaches, fronted by sand-banks which dry. The northern extremity is a conspicuous red cliff, from which a reef, which dries, extends about 4 cables northward. Sōshi tō lies on a bank with depths of less than 3 fathoms (5^{m}5); a rock, which dries 8 feet (2^{m}4), lies on the northern edge of this bank and about three-quarters of a mile northward of the northern extremity of the island. Kotsukin sho (Murukunu yo), a rock 5 feet (1^{m}5) high, lies on the north-western edge of this bank.

Gai-Chōko (Petchanko) tō lies with its southern extremity nearly 2 miles north-north-westward of the northern extremity of Sōshi tō and on the bank, with depths of less than 3 fathoms (5^{m}5), which extends from the south-western end of Anmin tō, and is surrounded by shoals and rocks, which extend about 1½ miles from its western side and terminate in a rock awash; the north-eastern and southern extremities of the island are cliffy, and there are shingle beaches along the other portions of the coast. Kodai tō lies with its southern extremity about 1½ miles northward of the northern extremity of Sōshi tō, and is surrounded by rocky ledges and sandbanks; its summit, 271 feet (82^{m}6) high, is situated in the southern part of the island.

Genzan (Onsan) tō lies with its south-western extremity about 1½ miles north-eastward of the northern extremity of Sōshi tō; Gorō hō (Unon pon), its summit, is situated in the western part of the island, and is 401 feet (122^{m}2) high. A pine wood on a hill 267 feet (81^{m}4) high, situated on the eastern extremity, is a useful mark when approaching Sachō ho. The southern side of the island consists mostly of sandy beaches, and a shoal, with depths of less than 3 fathoms (5^{m}5), which partly dries, extends fully 2 miles southward; Nōdaishi tō (Nafutegii somu), an islet covered with grass, lies on the south-western end of this shoal and nearly 2 miles southward of the south-west point of Genzan tō. Some rocks, which dry, lie about a quarter of a mile northward of Nōdaishi tō. A reef extends about 3 cables south-eastward from the south-east point of Genzan tō, and there is a tide race over it. The north coast is indented by several bays, but they all dry; there are some villages on this side of the island.

Charts 913, 3480, 1262.

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Chart 3699.

SACHŌ HO.—Sachō ho (Sajan kaye) extends about 15 miles in a northerly direction from its entrance, between the eastern extremity of Genzan tō and Shō tō (Soru somu), situated about 1¼ miles north-eastward, to where a promontory divides it into two arms, both of which dry except for narrow channels in the middle; the east coast of Anmin (Ammin) tō forms the western side of this gulf. Just within the entrance are numerous islets and reefs, so that the fairway into the sound is somewhat tortuous, but for some miles within these there is plenty of room, and the depths are convenient for anchoring.

Islet and dangers in the approach to Sachō ho.—Ryū tō (Yongu somu), a small islet with some low trees on its summit, lies about 3¼ miles south-south-eastward of Botsubo tō and on the western side of the approach to Sachō ho; a rock, which dries 7 feet (2m1), lies close off the western side of this islet. Some sandbanks, with depths of from 2 to 5 fathoms (3m7 to 9m1) over them, lie within a distance of 6 miles southward and one mile eastward of Ryū tō.

A rock, which dries 20 feet (6m1), lies nearly 1¼ miles north-north-eastward of Ryū tō, and close northward of this rock is a rock which dries 11 feet (3m4). A sandbank, with a least depth of 1¾ fathoms (3m2) over it, lies about one mile eastward of these two rocks, and another sandbank, with a least depth of one fathom (1m8) over it, lies with its western extremity about 1¼ miles northward of the rocks; these two sandbanks lie on the western side of the fairway, and there are depths of less than 5 fathoms (9m1) between them.

Tasurigī amu (*Lat. 36° 17′ N., Long. 126° 29′ E.*), a rock 46 feet (14m0) high, with two peaks of a reddish-grey colour, lies about 3¼ miles east-north-eastward of Ryū tō and on the eastern side of the fairway; this rock lies on the western side of a bank with a least depth of 4 feet (1m2). A 4¼-fathom (8m7) patch lies about three-quarters of a mile westward of Tasurigī amu, and a bank, with depths of less than 5 fathoms (9m1), extends about 1¾ miles southward from a position about one mile south-westward of this rock.

Sonyo (Soniyo) amu, about 2 miles northward of Tasurigi amu and 1¼ miles off the eastern side of the channel, consists of three rocks which dry; they are marked by ripples, except during the period of slack water.

Entrance.—Anchorage.—Islets and dangers.—Shō tō (Soru somu) is an islet lying on the mud bank which extends from the main coast on the eastern side of the entrance to Sachō ho; there is a bare hill, with a rounded summit, 223 feet (68m0) high, on its western end. A reef extends about 4 cables south-westward from the southern side of the island, and on this reef is an islet, 36 feet (11m0) high, and several rocks which dry. Chiku tō, an islet 58 feet (17m7) high, lies on the coastal bank nearly one mile south-eastward of Shō tō; a reef, which dries, lies on the edge of the coastal bank about 6 cables southward of Chiku tō. A reef, which dries, extends about a quarter of a mile from a point situated on the coast about half a mile northward of Shō tō.

Vessels which do not wish to proceed up Sachō ho can anchor about 1¼ miles eastward of the eastern extremity of Genzan tō, in a depth of 7 fathoms (12m8), sand and shells, with a group of conspicuous trees on Hoka (Ponha) san, a hill 763 feet (232m6) high situated about 1¾

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Chart 3699.

miles eastward of Shō tō, in line with Chiku tō, bearing 057°, and the summits of Chū tō and Mōtoku tō (Somumondoki), two islets within the entrance to Sachō ho, in line bearing 318°; this anchorage is sheltered from all except southerly winds, and the tidal streams are not strong.

Kōshi (Hyoja) tō lies about 2 cables off the north-eastern side of Genzan tō and has a hillock, 142 feet (43m3) high, on its northern extremity; a shoal, with depths of less than 3 fathoms (5m5) over it, extends fully half a mile southward from the eastern extremity of Kōshi tō, and Rikumōtoku, a small islet 34 feet (10m4) high, lies on the drying reef which extends about one cable eastward from this point. The channel between Kōshi tō and Genzan tō has depths of from 5½ to 9 fathoms (10m1 to 16m5), but shoals extending from either side reduce the width of the fairway to about half a cable, and the tidal streams sometimes attain a rate of 5 knots.

Mōtoku tō (Somumondoki) is a small islet lying nearly half a mile north-eastward of the eastern extremity of Kōshi tō, and a reef, which dries, extends about half a cable from its western side. There is a least depth of 8 fathoms (14m6) in the fairway of the channel between Mōtoku tō and Kōshi tō.

Kan sho (Seinyo) consist of two rocks, the southern of which lies about 3½ cables northward of Kōshi tō and dries 7 feet (2m1); the northern rock dries 15 feet (4m6). These rocks are plainly marked by overfalls, except from one hour before to one hour after high water. So tō lies close off the south-eastern end of Anmin tō, with its eastern extremity about 3 cables north-westward of the northern Kan sho, and has a wooded hillock, 118 feet (36m0) high, on its south-western end. Chū tō (*Lat. 36° 24′ N., Long. 126° 26′ E.*) lies about a quarter of a mile northward of the eastern end of So tō, and has a densely wooded and somewhat conspicuous hill, 101 feet (30m8) high, almost in the middle. Rochishi tō (Ishiruaruji somu) is a rocky islet lying about 6 cables north-eastward of Chū tō; it is surrounded by a reef, which extends about one cable from the southern, western and northern sides of the islet. All these islets and dangers lie on the western side of the main channel into Sachō ho.

On the eastern side of the channel are several islets and numerous reefs. Sankeitei tō (Punuyuku somu) lies with its northern extremity about 7 cables eastward of Chū tō; there are three conspicuous columnar rocks on the reef, which dries, extending about one cable south-eastward from the south-east point of this islet. A rock above water lies close off the western side of Sankeitei tō, and a rock, which dries 3 feet (0m9), lies nearly 2 cables westward of the south-west point of the islet: a reef, with a least depth of 1½ fathoms (2m7) and generally marked by ripples, lies about 2 cables southward of this point. Riku tō (Yuku somu) lies about 2 cables northward of Sankeitei tō and has a single tree on its summit; a reef, which dries, extends about a quarter of a mile south-eastward from its south-east point. Riku tō and Sankeitei tō are connected by a shoal with depths of less than 2 fathoms (3m7). Anba tō, 50 feet (15m2) high, lies nearly 3 cables south-eastward of Sankeitei tō, and Boku tō, 30 feet (9m1) high, lies about 3½ cables north-eastward of Anba tō, with numerous rocks and reefs, which dry, between them. Northward of Boku tō is a large shoal with four islets on it, which are practically joined together

Charts 913, 3480, 1262.

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Chart 3699.

by reefs which dry; Getsu tō (Taru somu), the southernmost of these islets, lies nearly a quarter of a mile northward of Boku tō, and the two northern islets are named Ka-Boku tō (Unnaamu somu) and Jo-Boku tō. Shō-Sō sho, a rock 24 feet (7m3) high, lies about 1½ cables westward of Kō tō, the remaining islet of this group.

A rock, which dries 9 feet (2m7), lies about 4 cables south-eastward of the east point of Getsu tō; a rock, which dries 8 feet (2m4), lies about 6 cables north-eastward of the same point, and a reef, with depths of less than 3 fathoms (5m5), extends about 3 cables south-westward from this rock. A shoal, which partly dries, extends about one mile in a northerly direction from a position about half a mile eastward of Jō-Boku tō.

Gosen kō is an inlet on the eastern side of the entrance to Sachō ho, and is entered about 2½ miles northward of Shō tō. A shoal, with a depth of 1½ fathoms (2m7) over it, lies in the middle of the entrance to this inlet, and a short distance farther inside is a bar with a least depth of 3 feet (0m9), except for a small portion near the middle, which dries 4 feet (1m2). For fully 1½ miles inside the bar there are depths of from 2 to 6 fathoms (3m7 to 11m0) in a channel about 2 cables broad. Gosen, a village containing a post office, is situated on the southern shore of the inlet and about 1½ miles within the entrance.

Inner part of Sachō ho.—Islets and dangers.—Anmin tō, on the western side of Sachō ho, is a hilly, wooded island separated from the mainland northward by a narrow passage named Hakusa suidō, which is impracticable even for boats except near high water. At the south-eastern end of the island, and nearly three-quarters of a mile northward of Chū tō, is a conspicuous headland 167 feet (50m9) high. Chōko (Neijanko) tō, an islet with a group of trees on its summit, lies about three-quarters of a mile northward of this headland and on the edge of the mud bank which extends from the coast; a reef, which dries, extends about 2 cables south-eastward from the south point of Chōko tō, and on this reef is Rōko gan (*Lat. 36° 26′ N., Long. 126° 26′ E.*), a rock 34 feet (10m4) high. An isolated rock, which dries 5 feet (1m5), lies about 4 cables south-eastward of Rōko gan and on the northern end of a reef with a depth of 1½ fathoms (2m3); a small sandbank, with a least depth of 1¾ fathoms (3m2) over it, lies about 4 cables eastward of this rock, and a 4¼-fathom (7m8) patch lies about 3½ cables north-eastward of the same rock. A 2¼-fathom (4m1) patch lies about 4 cables north-eastward of Chōko tō. Kei tō (Taku somu), an islet with a group of trees on its summit, lies about three-quarters of a mile northward of Chōko tō and on the edge of the mud flat which extends from the coast; a rock, 16 feet (4m9) high, lies about 2 cables southward of Kei tō. A reef, which dries, and has three rocks above water on it, lies about half a mile north-north-eastward of Kei tō, and about one mile northward of this islet is a small rock in the middle of a sandbank; a ridge of sandbanks extends about 7 miles northward from a position about one mile northward of this rock, and finally connects with the mud bank which extends from the east coast of Anmin tō.

On the eastern side of Sachō ho, and nearly 1½ miles north-north-westward of the northern entrance point of Gosen kō, is a small islet 37 feet (11m3) high; a reef, with a depth of one fathom (1m8) on its outer end, extends about 4 cables south-westward from this islet.

Charts 913, 3480, 1262.

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Chart 3699.

Nearly half a mile south-eastward of this islet, and connected to it by a sandy spit, is an islet 42 feet (12m8) high, with a single pine tree on its summit; rocks, which dry, extend about half a mile south-westward from this latter islet, and a reef, which dries, lies about half a mile north-westward of the 37-foot (11m3) high islet and is connected to the coast by a shingle spit. An extensive shoal, with depths of less than 3 fathoms (5m5) over it, lies nearly in the middle of Sachō ho; there are several islets, covered with trees and grass, also some rocks which dry, on this shoal, and the position of these can best be seen on the chart.

Directions.—Vessels bound for Sachō ho from the southward should make for Yen tō (page 463), and from a position about 2 miles westward of this island should steer for the 186-foot (56m7) high hill on the extremity of the promontory separating Kōgan ho and Daisen kō (page 464), bearing 022°. When Shuren (Chuyomu) san, a peak 1,141 feet (347m8) high, situated at the head of Bējā wan (page 463), is over the northern entrance point of that bay, bearing 092°, vessels should steer for Gorō hō, the summit of Genzan tō (page 468), bearing 347°. When Ryū tō (page 469) bears 308°, the 694-foot (211m5) high peak on the eastern side of Sachō ho and about 6 miles northward of Shō tō should be kept in line with the western extremity of that island, bearing 012°, which leads about half a mile westward of Sonyo amu. When fully one mile from Shō tō alter course north-westward with the western end of Chū tō in line with the 263-foot (80m2) high hill about one mile north-westward, bearing about 322°, thus passing midway between Rikumōtoku and Mōtoku tō; thence keep the eastern extremities of Genzan tō and Kōshi tō in line, bearing 167° astern, which leads between Chū tō (*Lat. 36° 24′ N., Long. 126° 26′ E.*) and Sankeitei tō, when course should be shaped to pass between Rochishi tō and Riku tō.

694-foot peak in line with W. extremity of Shō tō, bearing 012°.

Vessels bound for Sachō ho from the northward or north-westward should pass between Kitsusan rettō (page 466) and Gaien rettō (page 464), and thence proceed to a position about 4 miles south-eastward of Dai-Kasa tō (page 467), where the south-eastern extremity of Genzan tō will be seen in line with the western extremity of Ryū tō, bearing 032°. Tasurigī amu (page 469) should then be steered for, bearing 055°, which leads between two sandbanks, with least depths of 2¼ and 2¼ fathoms (4m1 and 4m6) over them, respectively, lying southward of Ryū tō; on this course Seiju san (page 464) will be seen well open southward of Tasurigī amu. When the 694-foot (211m5) high peak on the eastern side of Sachō ho is in line with the western extremity of Shō tō, bearing 012°, the directions given for vessels from the southward should be followed. This route is only suitable for vessels of moderate draught; vessels of deep draught should steer for Yen tō after passing between Kitsusan rettō and Gaien rettō, and thence follow the directions given for vessels from the southward.

Small vessels bound for Sachō ho from the northward can steer for Ryū tō bearing 140°, and seen midway between Gaisen tō and

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Chart 3699.

Butsubo tō (page 468); when the summit of Dai-Kitsusan tō (page 466) is in line with the northern extremity of Ka tō, bearing 274°, this mark should be kept astern, which leads between the shoals north-eastward of Ryū tō. When the 694-foot (211m5) high peak on the eastern side of Sachō ho is in line with the western extremity of Shō tō, bearing 012°, proceed as directed for vessels from the southward.

Tidal streams.—The tidal streams in Sachō ho run northward and southward; the north-going stream runs from one hour after low water till one hour after high water, and the south-going stream from one hour after high water until one hour after low water, slack water only lasting for about 10 minutes. The maximum rate of the tidal streams near Tasurigī amu is from 1½ to 2 knots; in the channel between the islets in the entrance the maximum rate is from 4½ to 6½ knots.

Heavy overfalls occur off the south-eastern extremity of Genzan tō and on the eastern side of the fairway. Near the northern end of Kōshi tō the tidal streams are very irregular and may thus cause the vessel to yaw.

COAST.—Western side of Anmin tō.—Islet and dangers.— The west coast of Anmin tō is indented by numerous bays, but they are all encumbered by flats which dry; banks of sand and mud, with rocky ledges, extend from this coast and dry out nearly three-quarters of a mile in places. There is a single conspicuous pine tree on a hill, 354 feet (107m9) high, situated at the south-western end of the island and about 2½ miles northward of the northern extremity of Gai-Chōko tō; this is the highest peak in the southern part of Anmin tō.

Gai tō (Oi Yomu) lies about 2 miles west-north-westward of the above-mentioned hill and nearly 1½ miles offshore, and foul ground extends about half a mile from its south-eastern and south-western sides; it is connected to the west coast of Anmin tō by a bank with depths of less than 3 fathoms (5m5). A rock, which dries 12 feet (3m7), lies about one mile north-north-westward of Gai tō, and a 2¾-fathom (5m0) patch lies close north-eastward of this rock. A rock, with a depth of 3 fathoms (5m5) over it, lies nearly 4 miles northward of Gai tō (*Lat. 36° 27′ N., Long. 126° 18′ E.*) and about one mile offshore.

The south-western entrance to Hakusa suidō (page 471) lies about 6½ miles northward of Gai tō. Anba tō, an islet 125 feet (38m1) high, lies on the mud bank on the northern side of the entrance; several rocks, which dry, known as Kakushi sho, lie within a distance of one mile southward of this islet.

Off-lying islands.—Nai-Hasui (Ampassu) tō lies about 3 miles westward of Gai tō, and a shingle spit, which dries, extends about 2 cables from its eastern side; a reef, with a rock above water on its outer end, extends about 3 cables south-westward from the south point of the island. Funsho (Punu yo) is a group of rocks, the highest of which, 68 feet (20m7) high, lies about 4 cables north-westward of the north-west point of Nai-Hasui tō. Gai-Hasui (Tappassu) tō lies about 1½ miles south-westward of Nai-Hasui tō, and has some low trees on it; a reef, with a rock above water on its outer end, extends about 2 cables from its north-eastern side, and a rock, 64 feet (19m5) high, lies about 1½ cables off the south-west point of the island and is almost connected

Charts 913, 3480, 1262.

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Chart 3699.

to it by a reef which dries. A reef, which was reported in 1907, is charted nearly one mile north-westward of Gai-Hasui tō, but its position is doubtful; it is stated to dry 5 feet (1^{m}5).

Rachi (Nachi) tō, about 4½ miles north-westward of Nai-Hasui tō, is a conical island covered with low trees and grass, and has cliffy coasts; there is a conspicuous rock, 20 feet (6^{m}1) high, close off its western side, and a rock, which dries 13 feet (4^{m}0), lies about 3 cables westward of the island.

Chart 913.

Dai sho (Tei nyo), nearly 4½ miles west-south-westward of Rachi tō, has two summits and is easily identified owing to its light-grey colour; a small rock lies close off its south-western side and is connected to it by a reef which dries.

Chart 3699.

Ibi tō is a group of four islets, the western of which, named To tō (Toki somu), lies about 3½ miles northward of Rachi tō and is separated from the other three, which are connected to each other by rocky ledges and sandbanks, by a clear channel with depths of from 5 to 8 fathoms (9^{m}1 to 14^{m}6); Shisai tō, the southern of these three, lies nearly three-quarters of a mile eastward of To tō. A rock, 59 feet (18^{m}0) high, lies on the sandbank which extends north-eastward from San tō (Samu somu), the middle islet. Ibi tō (Ummi somu) is the northern islet of the group.

Kyoji (Kouru) tō lies about 1½ miles eastward of Ibi tō (*Lat. 36° 36′ N., Long. 126° 12′ E.*) and about 2 miles off the main coast; its summit, 252 feet (76^{m}8) high, is at the northern end, and on the southern extremity of the island is a conical hill 248 feet (75^{m}6) high. A rock, 6 feet (1^{m}8) high, lies close off the south point of Kyoji tō; a rock, which dries 10 feet (3^{m}0), lies about half a mile south-south-westward of this point, and a rock, which dries 14 feet (4^{m}3), lies about half a mile southward of the same point. A shingle spit extends about 7 cables eastward from the northern end of this island.

Charts 3699, 913.

Coast.—Between the point on the northern side of the south-western entrance of Hakusa suidō and Kanchō kaku, situated about 11 miles north-westward, the coast is indented by two bays, separated from each other by a peninsula, close off the extremity of which are the islands Shinshin (Munshan) tō and Ba tō. The south-eastern of these two bays has depths of less than 3 fathoms (5^{m}5) over the greater part, and there are several rocks, which dry, in it.

The north-western bay practically dries throughout, and only boats can proceed up it for about 3 miles. A peak 713 feet (217^{m}3) high, with a pointed boulder on its summit, is situated on the north-western end of the peninsula which separates these two bays and is conspicuous. Shinshin tō is a round-topped island, and an islet lies about 2 cables off its south-west point and is connected to it by a reef which dries; Ba tō lies about a quarter of a mile westward of Shinshin tō and is 223 feet (68^{m}0) high.

Charts 913, 1258.

Kanchōkō suidō.—Light.—Ō tō (Toku somu) is a conical islet lying about 6½ miles south-westward of Kanchō kaku and is the outermost of a chain of islets and rocks which extends in a south-westerly direction from that point.

Charts 1256, 3480, 1262.

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Charts 913, 1258.

A light is exhibited, at an elevation of 237 feet (72m2), from a white octagonal concrete tower, 50 feet (15m2) in height, situated on Ō tō.

Kagi (Kai) tō lies with its south-western extremity about 2 miles north-eastward of Ō tō and has several peaks, the summit being 592 feet (180m4) high. Tan tō (Kutsu somu) lies about half a mile westward of the south-west point of Kagi tō. There are several rocks and reefs between the north-east point of Kagi tō and Kanchō kaku. One of these, 33 feet (10m1) high, lies nearly one mile north-north-eastward of the north-east point of Kagi tō; a reef extends about 4 cables southward from this rock, leaving a clear passage 4½ cables wide, with a least depth of 7 fathoms (12m8), between it and the north-east point of Kagi tō, and which forms the northern entrance to Kanchōkō suidō. In bad weather, especially with strong southerly winds, there is a heavy sea between Ō tō and Kagi tō, and also for some distance westward of the former.

The southern entrance to Kanchōkō suidō lies between Ō tō and Teisoku tō, an islet 139 feet (42m4) high lying about 3½ miles eastward; a large flat rock is connected to the south-western side of Teisoku tō by a ledge which dries. A rock, which dries 10 feet (3m0), lies about three-quarters of a mile northward of Teisoku tō, and Mokugai tō, an islet 198 feet (60m3) high, lies about 1¾ miles eastward of the latter; a rock, 8 feet (2m4) high, lies about 3 cables northward of Mokugai tō. Kaki sho (*Lat. 36° 40′ N., Long. 126° 07′ E.*), 29 feet (8m8) high, lies about 1¼ miles north-north-westward of Mokugai tō, and a reef extends about 2 cables north-eastward from it; a rock, which dries 17 feet (5m2), lies about midway between Kaki sho and the 8-foot (2m4) high rock previously mentioned.

Kanchōkō suidō is sometimes used by small vessels proceeding to Chemulpho (page 486) from the southward or vice versa; these vessels can also pass eastward of Mokugai tō and Kaki sho.

Tidal streams.—The tidal streams off the eastern side of Kagi tō run northward and southward; the north-going stream runs from about one hour after low water till about one hour after high water, and the south-going stream from about one hour after high water till about one hour after low water. The maximum rate is 4 knots; overfalls occur in places.

Outlying islets westward of Kanchō kaku.—Light.—A chain of islets, including those described with Kanchōkō suidō, extends nearly 30 miles westward from Kanchō kaku. Kakureppi rettō (Clifford islands), the outermost of these, comprises three islets, the eastern and largest of which lies about 20½ miles westward of Ō tō. *See* view facing page 465.

A light is exhibited, at an elevation of 341 feet (103m9), from a white framework structure, 31 feet (9m4) in height, situated on the northern side of the northern islet of Kakureppi rettō. A fog signal is sounded from the lighthouse.

Seki tō (Long island), about 6 miles eastward of the northern islet of Kakureppi rettō, has a rock, named Saku somu, close off its northern extremity, which resembles a junk when seen from the eastward or westward; a rock, 37 feet (11m3) high, lies close off the south-western side of Seki tō. Sodein, about half a mile south-eastward of Seki tō, appears conical when seen from the eastward or westward, but shows two rounded hummocks of unequal elevation when seen from the

Charts 1256, 3480, 1262.

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Charts 913, 1258.

northward. Penpen, about 2¼ miles north-eastward of Sodein, has a rock, which dries 16 feet (4m9), about 1½ cables off its south-west point.

Ran tō (Aru somu) lies about 3½ miles eastward of Penpen, and Kyushi tō (Kunshi) lies about 1½ miles farther eastward; three rocks lie close together about three-quarters of a mile south-westward of Kyushi tō, the highest being 171 feet (52m1) high.

Koku tō (Gubbins island), about 5 miles north-eastward of Kyushi tō, is easily identified owing to its double summit, the northern being densely wooded and the southern covered with grass; there are some dwellings on the eastern side of the islet.

Katai gan consists of two isolated rocks lying about 3 miles north-north-eastward of Koku tō; the western rock is 2 feet (0m6) high, and the eastern is 7 feet (2m1) high.

A narrow bank, with depths of from 8 to 10 fathoms (14m6 to 18m3) over it, extends about 8½ miles in a north-easterly direction from a position about 4 miles west-north-westward of Koku tō. North-eastward of this bank, and about 9½ miles north-north-eastward of Koku tō, is an isolated patch with a depth of 7 fathoms (12m8).

Chart 1258.

Coast.—The coast between Kanchō kaku (*Lat. 36° 43′ N., Long. 126° 07′ E.*) and Chōkoku tō, about 11 miles northward, is of a hilly nature, the hills being covered with grass and almost devoid of trees; there are villages and cultivated areas between the hills.

Rai tō is a small peninsula, 200 feet (61m0) high, nearly 4 miles northward of Kanchō kaku, and appears as an islet when seen from the northward or southward. Gaiken is a sharp promontory about one mile north-eastward of Rai tō, and there are several rocks in the bay between. Kei tō, an islet 111 feet (33m8) high, lies close to the coast and about one mile northward of Gaiken; a rock, which dries 11 feet (3m4), lies about 6 cables northward of Kei tō.

Dairyō san, a hill 377 feet (114m9) high, is situated near the northern end of a peninsula about 8 miles northward of Kanchō kaku. Batsu kai (Joachim bay) is entered between the northern extremity of this peninsula and Chōkoku tō, situated about 2½ miles northward. About one mile within the entrance the bay divides into two branches, the northern of which, named Sangai, dries entirely; Kinri wan, the southern branch, has three arms, and the central one runs for about 4½ miles in a south-south-easterly direction, but the greater part of it dries. The entrance to Kinri wan is between two rocky ledges, and is only practicable for boats. Ō sho, a rock 43 feet (13m1) high, lies on the northern side of the entrance to Batsu kai. The best anchorage is in about the middle of the entrance, in a depth of 10 fathoms (18m3), fine sand; the tidal streams are irregular, and attain a rate of from one to 2 knots.

Chart 1270.

About 3 miles north-eastward of Chōkoku tō is the western entrance point of a large bay which dries almost throughout; there are several islets in the bay, the largest of which, named Chiku tō, has a tree on its summit.

Off-lying islets and dangers.—Light.—Shin tō, an islet covered with grass, lies about 1½ miles west-north-westward of Ckōkoku tō and on the south-western end of Chōan tai, a bank which extends

Charts 1256, 3480, 1262.

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Chart 1270.

about 17 miles in a north-easterly direction from this islet, and forms the southern side of the eastern approach channel to Chemulpho. There are several islets and patches of sand which dry, on the bank, and there are two channels across it, with depths of from 5 to 9 fathoms (9m1 to 16m5), about 7 and 11¼ miles north-eastward of Shin tō; both sides of the bank are steep-to. Chōan tai lies across the entrances of the various bays on the mainland north-eastward of Chōkoku tō, leaving a channel from 1¼ to 2¾ miles wide, with depths of over 10 fathoms (18m3), where temporary anchorage can be obtained, but the tidal streams are strong.

A reef, with two rocks above water on it, lies about 1½ cables southward of Shin tō, and depths of from 4 to 5 fathoms (7m3 to 9m1) extend about a quarter of a mile south-westward from this reef. Dai tō, nearly 2 miles north-north-eastward of Shin tō, is the largest of a group of islets lying on the south-western part of Chōan tai, and its south-eastern side is precipitous; Ki tō and Bōkō (Hōkō) tō lie eastward of Dai tō, and Sha tō and Entotsu tō lie westward of that islet. An isolated rocky patch, with a depth of 7 fathoms (12m8) over it, and steep-to all round, lies about 1½ miles west-south-westward of Dai tō. An tō lies nearly 1¾ miles northward of Dai tō and has a double summit; a 4½-fathom (8m2) patch lies about half a mile north-eastward of An tō.

A light is exhibited, at an elevation of 119 feet (36m3), from a white square iron framework tower, 26 feet (7m9) in height, situated on An tō.

Coast.—Sōhonai.—Sōhonai penetrates the land about 13 miles in a southerly direction, and its western side is formed by a long, narrow tongue of land, the northern extremity of which is named Manbatsu (Manku) tan and lies about 8 miles north-eastward of Chōkoku tō; Ōgon tō, which forms the eastern entrance point of the bay, lies nearly 1½ miles north-eastward of Manbatsu tan (*Lat. 36° 59′ N., Long. 126° 18′ E.*) and has a group of trees on its summit; its western side is precipitous. Suiri sho, a reef with three heads, which dry from 6 to 13 feet (1m8 to 4m0), lies about 3 cables northward of Manbatsu tan. Kajin sho, a rock 71 feet (21m6) high, lies about half a mile west-north-westward of the north point of Ōgon tō.

The greater part of Sōhonai dries, but there is a narrow channel down the centre, which leads to Kyūtō byōchi at the head. There are several islets and rocks close to the fairway. Chōkyū tō lies on the western side and about one mile southward of Manbatsu tan; on the eastern side of the channel abreast this island is Tanshi gan, a sandbank which dries. Hi tō lies about one mile southward of Chōkyū tō and on the mudbank which extends from the western side of the bay; this islet is wooded with small pine trees, and there is one large tree on its summit. A rock, which dries 13 feet (4m0), lies about one cable off the north-eastern side of Hi tō. Jō-Gyū (Jōgu) tō lies about one mile eastward of Hi tō and on the eastern side of the main channel; Ka-Gyu tō lies close southward of Jō-Gyū tō and has a conspicuous group of pine trees on its summit. These two islets lie in the outer end of a mud bank which dries; the channel eastward of them is shoal, and loses itself in the mudbank after about 3 miles. Chō (Koyū) tō lies about half a mile eastward of Ka-Gyu tō, and Yū tō, with a conspicuous group of pine trees on its summit, lies about three-quarters of a mile south-eastward of Chō tō. Koha (Koba) tō, with a group of pine trees

Charts 1258, 1256, 3480, 1262.

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Chart 1270.

on the northern side of its summit, lies about one mile southward of Ka-Gyu tō, the main channel passing between them; the channel westward of Koha tō is too shallow to be of any use except for boats. The main channel curves round the southern end of Koha tō and becomes very narrow. Ritsu tō lies about 2½ miles south-westward of Koha tō and on the western side of the channel; a rock, 16 feet (4^{m}9) high, lies close off the eastern side of Ritsu tō, and about one cable southward of this rock is a rock which dries 4 feet (1^{m}2). Gyūbu gan, a small patch of hard sand which dries 3 feet (0^{m}9), lies about three-quarters of a mile southward of Ritsu tō, and close westward of Gyūbu gan is a reef which dries 2 feet (0^{m}6); the fairway passes westward of the latter and is very narrow.

The village of Kyūtō is situated at the head of the bay, and about 2 miles south-south-eastward of Ritsu tō. Kyūtō byōchi, the anchorage off the village, is only available for small craft; two rocks, which dry 8 feet (2^{m}4) and 5 feet (1^{m}5), respectively, lie on the eastern side of the anchorage. A light is exhibited from a beacon on the head of a small mole at Kyūtō.

There are several conspicuous hills on the peninsula which separates Sōhonai and Tokugan po, the next inlet eastward. Dokukandōji (Dokkandoji) is situated about one mile eastward of Ōgon tō and has a group of pine trees on its summit. Sankichi san is a sharp peak about 4½ miles farther eastward and on the western side of the entrance to Tokugan po.

Chart 1270, and plan of Gazan byōchi and approaches on 3642.

Tokugan po.—Islands and dangers.—A number of islands and islets lie off the entrance to Tokugan po. Dai-Ranshi tō, the largest of these, lies with its southern extremity about 2½ miles north-north-westward of Sankichi san; it has several peaks, the highest of which, named Doken, has a group of pine trees on its summit, and rises almost perpendicularly from the south coast to an elevation of 408 feet (124^{m}4). There is a bay on the east coast, and another on the north coast, but both dry entirely. Tetsu tō, 86 feet (26^{m}2) high, lies about half a mile off the west coast. The northern extremity of Dai-Ranshi tō is separated from the north-eastern end of Chōan tai by a narrow channel with depths of over 10 fathoms (18^{m}3) in the fairway; on the eastern side of this channel, and close to the coast of Dai-Ranshi tō, is a rock which dries 9 feet (2^{m}7).

Shō-Ranshi tō lies about 2 cables southward of the south-east point of Dai-Ranshi tō; Gyūbu tō (*Lat. 37° 02′ N., Long. 126° 27′ E.*), sparsely covered with pine trees, and some other islets and rocks, lie on a shoal which extends as much as half a mile from the southern side of Shō-Ranshi tō. Hikei tō lies nearly one mile south-westward of Shō-Ranshi tō and has two summits, the south-eastern, 191 feet (58^{m}2) high, being slightly the higher of the two; a shoal, with a depth of less than 3 fathoms (5^{m}5) over the greater part, extends nearly one mile north-westward from the north-west point of Hikei tō, and a rock, which dries 7 feet (2^{m}1), lies on this shoal and about 3 cables northward of this point. A 2½-fathom (4^{m}1) patch lies about midway between the north-west point of Hikei tō and the south-west point of Dai-Ranshi tō. Kokugyō tō lies about 1½ miles westward of Hikei tō and half a mile northward of Tan kan, the northern extremity of the peninsula separating Tokugan po from Sōhonai; a sandbank, which

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Chart 1270, and plan of Gazan byōchi and approaches on 3642.

partly dries, extends about 1½ miles from the western side of Kokugyō tō, and also about 4 cables from the eastern side of this islet. Kō tō, an islet with some pine trees on its summit, lies close off Tan kan, and a rock, which dries 13 feet (4m0), lies about 1½ cables northward of Kō tō. A rock, 6 feet (1m8) high, lies about midway between Kō tō and Hikei tō, and about a quarter of a mile east-south-eastward of this rock is another rock, 9 feet (2m7) high ; these two rocks lie on the edge of the mudbank, which dries, extending from Shō kō, a point situated nearly 1½ miles eastward of Tan kan. The main channel leading to Tokugan po is northward of Kokugyō tō and southward of Hikei tō.

Shō-Chō tō lies about three-quarters of a mile eastward of Hikei tō ; Dai-Chō tō, with a group of trees on its summit, lies close southward of Shō-Chō tō and is connected to it by a mudbank which dries. Dai-Tōhi tō lies about 4 cables eastward of the north point of Dai-Chō tō, and close off the eastern side of the former is Shō-Tōhi tō ; Kyō sho, a reef awash at high water, lies about 3 cables north-westward of Dai-Tōhi tō, and a rock, which dries 13 feet (4m0), lies about 3 cables northward of the same islet. A rocky ledge extends about 2 cables from the western side of Dai-Tōhi tō, and close southward of this ledge is a reef which dries 8 feet (2m4). All these reefs lie on the edge of the mudbank which forms the eastern side of the entrance to Tokugan po.

The entrance to Tokugan po lies between Keishū kaku, a point about one mile south-south-westward of Dai-Tohi tō, and the northern extremity of Sōraku tō, situated about 1½ miles east-north-eastward, but the navigable width is reduced to barely half a mile by the mudbank which extends from Sōraku tō. The channel runs about 2½ miles south-south-eastward from the entrance, with depths of from 5 to 9 fathoms (9m1 to 16m5), and then divides into two arms ; the western arm continues southward for about 5 miles, becoming gradually shoaler until it ends in the mud flat ; the eastern arm, named Sengi ho, runs along the southern side of the mudbank extending from Sōraku tō for about 1½ miles as far as Tōshinho ri (Kaisō), where it divides into two, one branch running east-north-east for about one mile, and the other running south-east for about 2 miles.

Gazan byōchi, the anchorage in the next inlet eastward of Tokugan po, is described on page 494.

Chart 1258.

APPROACH TO CHEMULPHO.—The approach to Chemulpho (page 486) from seaward is bounded southward by the chain of islets extending westward from Kanchō kaku, described on page 475, and northward by the outer islands of Tokuseki guntō. From northward of An tō lighthouse (page 477) there are two channels of approach, Higashi suidō and Nishi suidō ; these two channels unite about 10 miles south-westward of Chemulpho.

Tokuseki guntō.—Light.—Toguseki guntō (Prince Imperial archipelago) is a large group of islands lying south-westward of Chemulpho ; most of these islands are barren and rocky, and only five of them are inhabited. *See* view A on chart 1258.

Mokutoku (Mogudeki) tō is conical and lies at the south-western end of the group and nearly 21 miles north-westward of Kanchō kaku ; a rock, which dries one foot (0m3), lies about 6 cables westward of this islet. A bank, with depths of from 8 to 11 fathoms (14m6 to 20m1)

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Chart 1258.

over it, extends about 7 miles in a south-westerly direction from a position about 3½ miles southward of Mokutoku tō.

A light is exhibited, at an elevation of 208 feet (63m4), from a white circular concrete tower, 19 feet (5m8) in height, situated on Mokutoku tō. A fog signal is made from the lighthouse (*Lat. 36° 56′ N., Long. 125° 47′ E.*).

Gatoku (Biniimu) tō, covered with grass, lies about 2½ miles north-eastward of Mokutoku tō; three rocky islets, the northern and highest of which is 90 feet (27m4) high, lie close off its eastern side. Han sho, a rock which dries 17 feet (5m2), lies about 1¾ miles eastward of Gatoku tō.

Dai-Rei tō (Pakuru), about 3 miles west-north-westward of Gatoku tō, is a rocky islet with a pointed rock on its summit. Shō-Rei tō lies close westward of Dai-Rei tō.

I tō (Shopaiul), nearly 9 miles north-eastward of Gatoku tō, has two peaks, the southern and higher being 705 feet (214m9) high; a chain of four small islets extends about one mile north-eastward from its east point. The boilers of a vessel sunk in 1895 lie about three-quarters of a mile south-westward of the south-west point of I tō, but the remainder of the wreck has been removed. The inhabitants of I tō live on the northern side of the island. Hakuga tō (Keunpaiul), an island with several peaks, lies about 2 miles north-westward of I tō and is inhabited; U tō, an islet 360 feet (109m7) high, lies close off the south-west point of Hakuga tō. Chi tō, 370 feet (112m8) high, lies about 2½ miles northward of the east point of I tō. The area enclosed by these three islands contains many islets and rocks, and the tidal streams are irregular; it should, therefore, be avoided.

Senkō tō (Seun cheup tau) lies about 4 miles north-eastward of the east point of I tō, and is covered with rocks and stones, with a few stunted trees; it has several peaks, the highest being 1,147 feet (349m6) high. Gyūtō gan, a rock which dries 23 feet (7m0), lies about 1½ miles southward of Senkō tō. In 1926 the *Shinsei maru*, with a draught of 20 feet (6m1), reported having touched bottom in a position about one mile northward of Senkō tō, but the existence of a danger here is doubtful.

Kutsugyō tō (Obeto), 434 feet (132m3) high; lies about 6 miles north-westward of Senkō tō, and there are several islets and numerous rocks between, the positions of which can best be seen on the chart. Mingyo dan, a rock 7 feet (2m1) high, lies nearly 4 miles south-south-westward of the south-west point of Kutsugyō tō, and Kasan tō (Saosan), a rocky islet 61 feet (18m6) high, lies nearly 2½ miles westward of the same point. Small vessels passing through the area enclosed by Senkō tō, Kutsugyō tō, and Hakuga tō must exercise the utmost caution. A shoal, with depths of less than 3 fathoms (5m5) over it, extends nearly 5 miles northward from a position about one mile westward of the north point of Kutsugyō tō.

Bunkō (Munkabu) tō, nearly 4 miles northward of Senkō tō, has a very conspicuous summit; there are depths of less than 3 fathoms (5m5) for one mile southward of the island. Bunkō tō is inhabited, the natives living at the head of a bay on the eastern side of the island. A bank, about 4 miles long in a north and south direction, which dries in patches and has depths of less than 3 fathoms (5m5) over the remainder, lies about one mile westward of Bunkō tō.

Charts 1256, 3480, 1262.

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Chart 1258.

Tokuseki (Taku chaku) tō, the largest island of the group, lies with its southern extremity about 1¼ miles northward of Bunkō tō, with shoal water between; its summit, 1,017 feet (310m0) high, is situated in the northern part of the island. There are four villages on the island. Zenbi tō (Chaoul) lies close off the northern extremity of Tokuseki tō and has two peaks, the north-western being 718 feet (218m8) high. A bank, with depths of less than 3 fathoms (5m5) over it, extends north-eastward from the north-eastern side of Tokuseki tō and connects with the bank which extends south-westward from Dai-Bui tō (page 484); this bank forms the north-western side of Nishi suidō.

Chart 1270.

Boku tō (*Lat. 37° 12′ N., Long. 126° 08′ E.*) lies about 6 cables off the southern side of Tokuseki tō, on a bank which encumbers the channel between the latter island and Bunkō tō. Soya tō is separated from the south-eastern side of Tokuseki tō by a channel about a quarter of a mile wide, except in one part, where it is almost blocked by rocky ledges extending from either side. There are several villages on Soya tō, one of which, named Soya ri, lies in the middle of the east coast; a rocky ledge, which dries entirely and has three small islets on it, extends about half a mile from the coast close northward of Soya ri, giving complete protection from the northward to fishing boats which assemble there during the season. Yōtō, a rocky islet 31 feet (9m4) high, is connected to the north point of Soya tō by a ledge which dries. Jintōta tō, an islet 71 feet (21m6) high, lies close off the south point of Soya tō; a bank, with depths of from 2½ to 5 fathoms (4m1 to 9m1), extends about 2 miles south-westward from a position about 4 cables south-westward of this islet.

Higashi suidō.—Islands and dangers.—Lights and buoys.— An tō, with its light, situated on the south-western end of Chōan tai, has been described on page 477. Chōan sho, about 9½ miles north-eastward of An tō, is a pinnacle rock which dries 7 feet (2m1); it is covered by a sector of *red* light from Fu tō between the bearings 026° and 035°. A cylindrical light-buoy, painted red, and exhibiting a *white flashing* light *every five seconds*, is moored about 3 cables westward of Chōan sho; owing to the strong tidal streams this light-buoy is liable to drag. A rock, with a least depth of 28 feet (8m5) over it, lies fully one mile north-westward of Chōan sho; the usual track through Higashi suidō passes between them.

Hō tō, situated about 4½ miles east-north-eastward of Chōan sho and on the eastern side of Higashi suidō, has two peaks, the northern and higher being 571 feet (174m0) high; there is a village, with cultivated land around, on the north-eastern side of the island. A sandbank, with depths of 10 fathoms (18m3) and less, extends in two long tongues south-westward from Hō tō; the southern tongue stretches to within 3 cables of Chōan tai; on part of the northern tongue there are depths of less than 5 fathoms (9m1), with a 16-foot (4m9) patch lying about 6 cables south-westward of the west point of Hō tō. A bank, which dries in parts, extends about 2½ miles eastward from Hō tō. Jō-Kōkei tō and the other islands on the western side of Higashi suidō are described on page 483.

Fu tō is an islet lying about 2¾ miles north-westward of Hō tō; Hien sho, a rock which dries 9 feet (2m7), lies about 4 cables eastward

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Chart 1270.

of Fu tō, and between them is a rock which dries 3 feet (0m9). The usual track through Higashi suidō passes westward of this islet. Shōhō tō, and the islands southward of it, which form the western side of the channel here, are described on page 483.

A light is exhibited, at an elevation of 120 feet (36m7), from a white circular stone tower, 40 feet (12m2) in height, situated on Fu tō. An auxiliary light, which shows over a small sector covering Chōan sho, is exhibited from the same lighthouse below the main light.

Seki sho is a small rock, 50 feet (15m2) high, lying about 1½ miles north-eastward of Fu tō. Sō sho, about 1½ miles north-eastward of Seki sho, is a conical islet lying on the extremity of the shoal, with depths of less than 6 fathoms (11m0), which extends south-westward from Reikō tō; Tsū sho, a rock which dries 9 feet (2m7), lies about 3 cables south-westward of Sō sho.

Tsū sho, a reef which dries 8 feet (2m4), lies about 1½ miles west-north-westward of Sō sho, and So shō, a black rock 43 feet (13m1) high, lies about a quarter of a mile northward of this reef. Fū tō consists of two flat-topped islets lying close together about 1½ miles north-eastward of Tsū sho.

Haku gan, a rock 9 feet (2m7) high, lies about 1¾ miles north-eastward of Fū tō; two other rocks lie within a distance of 4 cables south-westward of Haku gan. A 5-fathom (9m1) patch lies about midway between the outer of these rocks and Fū tō. A light is exhibited, at an elevation of 45 feet (13m7), from a black hexagonal stone tower, 40 feet (12m2) in height, situated on Haku gan. Owing to the dark background, when approaching from the southward, the lighthouse does not show up well by day.

Sho-obatsu consists of two small islands lying nearly in the middle of a bank, with depths of less than 3 fathoms (5m5), which extends southward almost to Fū tō; the eastern island lies about three-quarters of a mile north-westward of Haku gan.

Reikō tō lies on the eastern side of Higashi suidō, with its south-western extremity about 1¼ miles eastward of Haku gan; mudbanks, which dry, extend from all its coasts. Kōchiku tō (*Lat. 37° 12′ N., Long. 126° 27′ E.*), a rock 56 feet (17m1) high, lies on the extremity of the mudbank which extends about one mile south-south-westward from the south point of the island; there are depths of less than 3 fathoms (5m5) for a distance of fully one mile southward of Kōchiku tō. Kokushi hō, the summit of Reikō tō, is situated in the northern part of the island, and has a conspicuous clump of trees on it, which forms a useful mark for Higashi suidō; Dogan san is situated nearly 1½ miles south-westward of Kokushi hō, and terminates westward in a headland named Bokutō, which is the western extremity of this island.

Tokō sho, and several other rocks, lie on the mud bank extending from the northern side of the island. Sui sho, a rock which dries 6 feet (1m8), lies nearly 1¾ miles north-eastward of Tokō sho and on the northern edge of a shoal with a depth of less than 3 fathoms (5m5); a rock, which dries 9 feet (2m7), lies about 1½ cables westward of Sui sho. Near the fairway westward of Sui sho the depths are irregular, and overfalls occur.

Nan-Chōshi sho, a rock 5 feet (1m5) high, lies about 2 miles north-eastward of Tokō sho. Hoku-Chōshi sho lies about one mile northward of Nan-Chōshi sho and is a similar rock. A light is exhibited, at an ele-

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Chart 1270.

vation of 45 feet (13^{m}7), from a red circular stone tower, 40 feet (12^{m}2) in height, situated on Hoku-Chōshi sho.

Hachibi tō is an islet lying on the western side of the fairway and about 2½ miles north-eastward of Hoku-Chōshi sho. A rock, which dries 16 feet (4^{m}9), lies about 3½ cables westward of Hachibi tō, and a rock, which dries 14 feet (4^{m}3), lies about one cable westward of the north-west point of this islet; a rocky islet lies close off the north-east point, and nearly half a mile north-eastward of this point is a rock with a depth of one foot (0^{m}3) over it. A sandbank, a large portion of which dries and which has depths of less than 3 fathoms (5^{m}5) over the remainder, extends nearly 4 miles in a north-easterly direction from a position about 1½ miles westward of Hachibi tō.

A light is exhibited, at an elevation of 219 feet (66^{m}7), from a white circular concrete tower, 26 feet (7^{m}9) in height, situated on Hachibi tō. Storm signals, classes 1, 2, and 3, are displayed from this light-station; *see* page 38.

The description of the channel leading to Chemulpho is continued on page 486; the directions for it are given on page 489.

Islands and dangers between Higashi suidō and Nishi suidō.— Ka-Kōkei tō lies nearly 2½ miles south-westward of Fu tō (page 481) and on the western side of Higashi suidō; a rock, which dries 5 feet (1^{m}5), lies about 2 cables eastward of Ka-Kōkei tō: Jō-Kōkei tō lies close northward of Ka-Kōkei tō; these two islands lie together on a shoal which extends about one mile south-westward of Jō-Kōkei tō.

Shōhō tō lies with Daisanji, its eastern extremity, nearly 1½ miles north-westward of Fu tō. Doken, the summit of the island, is 329 feet (100^{m}3) high and has some large pine trees on it, which are a good landmark. Kon tō lies about 3 cables southward of the south-eastern end of Shōhō tō, with some rocks between. A 2¾-fathom (5^{m}0) patch lies about half a mile north-north-eastward of Daisanji, and a narrow bank, with depths of less than 3 fathoms (5^{m}5), extends about 2 miles northward from a position about three-quarters of a mile northward of Daisanji. A bank, with depths of less than 3 fathoms (5^{m}5), extends about one mile northward from the northern side of Shōhō tō; Kaizen sho (*Lat. 37° 11′ N., Long. 126° 18′ E.*), a rock which dries 14 feet (4^{m}3), lies on the north-western part of this bank.

Shō-Isaku tō lies westward of Shōhō tō, and is separated from it by a narrow strait in which are several rocks; Keinanri tō, the south-eastern extremity of Shō-Isaku tō, is connected to the main island by a narrow strip of sand. Isaku ri is a village at the head of a bay on the north-western side of Shō-Isaku tō. Kabatsu sentai, a large bank which dries, lies southward of Shō-Isaku tō, and is separated from it by a narrow but deep channel; the south-western extremity of this bank lies about 2½ miles south-westward of the west point of Shō-Isaku tō, but there are depths of less than 5 fathoms (9^{m}1) for a further 2 miles south-westward. Shō-Shōhō (Sha) tō lies nearly half a mile southward of Keinanri tō; a bank, which dries, extends about half a mile from its western side, and on this bank is a small islet named Batsu sho. Kō (Go) sho, a rock 3 feet (0^{m}9) high, lies about 6 cables south-westward of the south point of Shō-Shōhō tō.

Dai-Isaku tō lies close westward of Shō-Isaku tō, and Batsuan tō is almost connected to the western extremity of the former; Batsu tō

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Chart 1270.

lies about 2 cables north-westward of Batsuan tō, and a rock, which dries 17 feet (5^{m}2), lies off the north-eastern extrance of the channel between. Sui sho, a rock which dries 9 feet (2^{m}8), lies about 2 cables northward of Batsu tō. Dōhaku tō, a small islet about a quarter of a mile north-north-westward of Batsu tō, is a useful mark for the navigation of Nishi suidō. A bank, with depths of from 4¼ to 10 fathoms (7^{m}8 to 18^{m}3), extends about 4 miles south-westward from a position about half a mile south-south-westward of Batsu tō.

Shigetsu tō lies with its western extremity about 5¼ miles north-eastward of Batsu tō; Kokushi hō, the summit of the island, is situated near its centre. Kō tō, an islet 49 feet (14^{m}9) high, lies about one mile south-eastward of Kokushi hō and a quarter of a mile offshore; Shō sho lies about 6 cables southward of Kō tō, and dries 14 feet (4^{m}3). Kō sho lies about 1¼ miles south-eastward of Kō tō, and dries 27 feet (8^{m}2). Kan sho, a reef which dries, lies with its northern extremity about 1¼ miles south-south-westward of Kō tō; there are depths of less than 3 fathoms (5^{m}5) for fully one mile westward of this reef. Banks, which dry in places, extend south-westward and north-eastward from the western end of Shigetsu tō, and bound the south-eastern side of Nishi suidō. Bokutō (Bokuyo) tō is a small islet lying about 4 cables west-north-westward of the north-west point of Shigetsu tō, with foul ground between.

Nishi suidō.—Islets and dangers.—Light-buoy.—Vessels making for Chemulpho through Nishi suidō pass eastward of Senkō tō (Chart 1258), described on page 480, and the channel then leads between Soya tō (page 481) and Dōhaku tō, and north-westward of Bokutō tō.

Sōchi guntō is a group of three islets lying in the middle of the bank which connects Tokuseki tō and Dai-Bui tō. Shō-Sōchi (Shōsōji) tō, the southernmost islet, lies nearly 2½ miles northward of Bokuto tō. Dai-Sōchi (Daisōji) tō lies about half a mile north-north-westward of Shō-Sōchi tō, and the third islet lies close off the south-western end of Dai-Sōchi tō. Sōchi gan, a rock which dries 19 feet (5^{m}8), lies nearly 2 miles westward of Dai-Sōchi tō. Between 1929 and 1932 the depths over the bank south-westward of Sōchi guntō were reported to be decreasing.

A cylindrical light-buoy, painted red, and exhibiting a *white flashing* light *every five seconds*, is moored about 2 miles south-westward of Sōchi gan.

Dai-Bui tō lies with its southern extremity about 7¼ miles north-eastward of Shō-Sōchi tō; it has two peaks, Koryū (Johō) san and Sekihō san, with low land between, and from a distance appears as two islands. On the northern extremity of the island is a third peak, 426 feet (129^{m}8) high, with a group of trees on its summit, which is conspicuous from the eastward or westward. The coast of the island consists mainly of sandy beaches and cliffs; on the southern side there are low cliffs of a reddish colour. Banks of sand and mud, which dry, extend for about 3 miles on the western side, and 2 miles on the eastern side. Jitsubi tō, an islet 161 feet (49^{m}1) high, lies about 2 cables off the north-west coast of Dai-Bui tō and on the edge of the mud bank which dries; Sōyō tō, with a few pine trees on it, lies on the mud bank which extends from the eastern side of the island, and two rocks above water lie about half a mile northward of it. Shō-

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Chart 1270.

Bui tō lies close off the south-eastern side of Dai-Bui tō, and several rocks lie within 3 cables of the south-east point of this islet. Kairi tō (*Lat. 37° 22′ N., Long. 126° 27′ E.*) is a conical islet about half a mile southward of Shō-Bui tō; a 2¾-fathom (5m0) patch lies about half a mile south-westward of Kairi tō.

Islands northward and north-eastward of Dai-Bui tō.—Ryūyū tō lies on a mud flat, which dries, with its southern extremity nearly three-quarters of a mile north-eastward of the northern extremity of Dai-Bui tō, and between the two is Sanshin tō. Kangaku (Kansōri) san, the summit of Ryūyū tō, is situated in the southern part of the island; Kōkoku san is a peak on the north-western extremity of the island, and Daidō san, with a conspicuous group of trees on it, lies about 1¼ miles south-south-eastward of Kōkoku san.

Eisō tō lies with its south-western extremity about 3 miles north-eastward of the east point of Ryūyū tō. Haku-un san, its summit, on which is a conspicuous clump of trees, is situated in about the centre of the island. The coasts are mostly mud or embankments, and there are salt pans along the south coast; there is a considerable amount of cultivation, and there are numerous villages. Shinbutsu (Shimbitsu) tō lies about 4 cables south-westward of the south-western extremity of Eisō tō, and has two summits of a pale yellow colour and of about the same elevation. Sanboku (Sammoku) tō lies about 4 cables off the west coast of Eisō tō, and has a group of trees on its summit.

Eisō tō is surrounded by mudbanks which dry, leaving only narrow channels between them and the banks which extend from Dai-Bui tō and Ryūyū tō.

Charts 1270, 1258.

Tidal streams.—In the area westward of the line through Kakureppi rettō, Tokuseki guntō, and Enhei rettō (page 485), and eastward of the line drawn south from Jun-i tō (page 507), the tidal streams are rotatory, turning round against the hands of a clock in 12 hours. That is, at the time of low water at Chemulpho the direction is between south and south-east, 3 hours after low water between east and north-east, at high water between north and north-west, and 3 hours after high water between west and south-west. The lowest rate occurs about the time of high and low water, and the maximum rate about 3 hours after high and low water.

Between Kutsugyō tō and I tō, and in that vicinity, there is a certain amount of variation according to the configuration of the land, but in general the tidal streams set north-eastward and south-westward, turning about the times of high and low water; the maximum rate may exceed 2 knots.

About 3 miles northward of Zenbi tō (page 481) the maximum rate of the north-east-going stream is about 2¾ knots, and that of the south-west-going stream about 3¼ knots; the streams here turn at about the times of high and low water.

In Higashi suidō and Nishi suidō the tidal streams in general run north-eastward and south-westward, turning at about the times of high and low water at Chemulpho. From observations made at spring tides, the streams attain a rate of about 4¼ knots about 4 miles eastward of I tō, nearly 4½ knots between Soya tō and Dōhaku tō, 2½ knots about 2 miles north-westward of Shigetsu tō, 2¾ knots from 5 to 6

Charts 1256, 3480, 1262.

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Charts 1270, 1258.

miles south-westward of Ka-Kōkei tō, 4 knots between Shōhō tō and Hō tō, and 3 knots off the west coast of Reikō tō. In the narrow part of Nishi suidō, however, the streams may attain a rate of 6½ knots at times. Between Dai-Bui tō and Reikō tō the tidal streams run eastward and westward, turning at about the times of high and low water at Chemulpho, and attaining a rate of 3 knots.

About 3½ miles south-westward of Dai-Sōchi tō the tidal streams turn through 360° in about 12 hours; from observations made at spring tides, at low water at Chemulpho the stream runs south-south-east with a rate of half a knot; 3 hours after low water, north-east at 1½ knots; at high water, north-north-west at three-quarters of a knot; 3 hours after high water, west-south-west at 1½ knots. About one mile north-eastward of Dai-Sōchi tō the tidal streams run north-eastward and south-westward, turning at about the times of high and low water at Chemulpho and attaining a rate of 1½ knots.

Chart 3642, plan of Chemulpho harbour.

CHEMULPHO HARBOUR.—Chemulpho harbour, known as Jinsen kō by the Japanese, is situated at the mouth of the En ka, which is a southern branch of the Kan kō; the western side of the harbour is bounded by the mud flats which extend from the southern side of Eisō tō, and the eastern side by those extending from the mainland. Chemulpho is an open port, and is the port of Seoul, the political and economic centre of Korea, situated some 15 miles inland. It is a natural harbour, well protected by islands and free from ice; its one disadvantage is the large rise and fall of the tide, over 30 feet (9^{m}1) at spring tides.

Getsubi tō, situated on the mud flat off the city of Chemulpho, rises gradually to its summit in the centre of the island, on which is a shrine; the western side is not so steep as the eastern, and there is a hillock, 46 feet (14^{m}0) high, on the northern extremity of the island. Getsubi tō is connected to Chemulpho by a causeway carrying a road. The Quarantine station is situated on the south-western extremity of the island, and there are two jetties here. Two disused wireless masts stand on the south-eastern side of the summit. Shō-Getsubi tō lies about half a mile southward of Getsubi tō and is connected to it by a mud flat, which dries, and by an embankment. There is a water-police station, with a flagstaff, near the southern end of the island. Shō-Getsubi tō is surrounded by a sea wall, and a stone pillar stands on the southern corner of this wall; close north-westward of this corner a series of horizontal lines, one foot (0^{m}3) apart, are marked on the wall, every fifth line being numbered to show its height in feet above datum level; there is a similar series of lines close east-north-eastward of the corner.

Sa tō (*Lat. 37° 28′ N., Long. 126° 37′ E.*) sparsely covered with pine trees, is situated nearly three-quarters of a mile east-north-eastward of Shō-Getsubi tō; En tō is about one mile south-eastward of Sa tō. These two islets are now the corners of land which has been reclaimed from the mudbank which dries. Shō-En tō lies close south-westward of En tō and has two rocky summits. Doku gan, a headland nearly 1½ miles southward of En tō, is sparsely wooded with pine trees.

Chūsanri, nearly 1½ miles north-westward of the northern extremity

Charts 1256, 3480, 1262.

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Chart 3642, plan of Chemulpho harbour.

of Getsubi tō, is an inhabited island of yellow sand lying on the edge of the bank extending from Eisō tō, and is connected to that island by a stone causeway; it is fringed by rocks, and there is a row of pine trees on its summit. Chakuyaku tō lies about 4 cables north-eastward of Chūsanri, and is easily identified, as it is more densely wooded than other places in the neighbourhood; it lies on the southern part of a mudbank, which dries, and which extends for nearly half a mile from its northern side. A rocky ledge extends about one cable from the eastern side of Chakuyaku.

Ritsu tō lies with its western extremity nearly 1¼ miles north-eastward of Chakuyaku tō and on the bank, which dries, on the eastern side of the river; it is a hilly island, and has a conspicuous group of trees on its summit. Chō (Kō) tō, which is sparsely covered with grass, lies close off the western extremity of Ritsu tō, and is connected to it by a reef which dries.

Chemulpho harbour is divided into two portions by Getsubi tō and Shō-Getsubi tō, the part eastward of these islands being the inner harbour. The harbour limits are as follows; the prolongation of the line joining Byō tō, a headland at the northern end of the city of Chemulpho, and the north point of Getsubi tō; a line drawn 262° through the southern extremity of En tō; and a line drawn 197° through the eastern extremity of Chakuyaku tō.

Outer harbour.—Dangers.—The general depths in the Outer harbour vary between 4 and 9 fathoms (7^{m}3 and 16^{m}5), and there is sufficient space for several large vessels to lie at anchor there.

A pinnacle rock, with a depth of 12 feet (3^{m}7) over it, lies nearly one mile south-south-westward of Shō-Getsubi tō. A shoal, with a least depth of 9 feet (2^{m}7) over it, lies about half a mile westward of Shō-Getsubi tō, and a rock, with a depth of 7 feet (2^{m}1), lies about half a mile north-westward of the same island; a shoal, with a depth of 16 feet (4^{m}9) lies about 3 cables north-westward of Shō-Getsubi tō, and within a quarter of a mile farther north-westward are two rocks with depths of 15 and 18 feet (4^{m}6 and 5^{m}5) over them, respectively.

A rocky shoal, with a least depth of 30 feet (9^{m}1), lies on the northern limit of the harbour and about 4 cables westward of Getsubi tō; about a quarter of a mile north-westward of this shoal is another rocky shoal, with a least depth of 4 fathoms (7^{m}3) over it.

Seitō gan lies about a quarter of a mile north-westward of the northern extremity of Getsubi tō and partly dries; tide rips occur over its western part.

Light.—Light-buoys.—Beacons.—A light is exhibited, at an elevation of 93 feet (28^{m}3), from a white circular stone tower with a black gallery, 31 feet (9^{m}4) in height, situated on Shō-Getsubi tō (*Lat. 37° 28′ N., Long. 126° 36′ E.*).

A light-buoy, painted black, and exhibiting a ***white flashing*** light ***every six seconds***, is moored on the western side of the river and about 3 miles south-westward of Shō-Getsubi tō lighthouse.

A light-buoy, No. 1, painted red, and exhibiting a ***white flashing*** light ***every three seconds***, marks the 2-fathom (3^{m}7) rock lying nearly one mile south-south-westward of Shō-Getsubi tō. A light-buoy, No. 2, painted red, and exhibiting a ***white group flashing*** light, giving two flashes ***every six seconds***, is moored off the sandbank on the southern side of the entrance to the Inner harbour.

Charts 1270, 1258, 1256, 1262.

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Chart 3642, plan of Chemulpho harbour.

A white pole beacon surmounted by a triangle, 30 feet (9m1) in height, stands on the western side of Getsubi tō.

Anchorage.—There is secure anchorage, with good holding ground, south-westward of Getsubi tō, and vessels which are too large to enter the Inner harbour can work cargo here. The best position is with Shō-Getsubi lighthouse bearing 050°, distant not less than 6 cables, in a depth of about 6½ fathoms (11m9); within this distance there are some scattered iron plates of a sunken vessel, which should be avoided. A strong southerly wind raises a sea, and it is then difficult to work cargo. The tidal streams are not strong.

Inner harbour.—The inner harbour lies eastward of Getsubi tō and Shō-Getsubi tō, and is bounded southward by a breakwater, with a groin extension, extending nearly 1½ miles south-westward from Sa tō. The greater part of the Inner harbour dries, leaving only a narrow channel leading to a tidal basin at the head; dredging is continually in progress to maintain a depth of at least 13 feet (4m0) over a width of about half a cable on the leading line through this channel, and also in an area westward of the entrance to the tidal basin.

The tidal basin has a lock, 60 feet (18m3) wide, and can be entered at any state of the tide; vessels can lie alongside the basin walls. In 1933 there were depths of about 28 feet (8m5) throughout the greater part of the basin. There is a signal station on the northern side of the entrance to the lock, where special local signals (*see* page 491) are displayed, as well as those of the International Code of Signals. Pilots board vessels requesting a pilot for entering the basin off Shō-Getsubi tō lighthouse. In 1937 a second basin was under construction southward of the one described above.

Several piers, for lighters and small vessels, extend from the shore north-westward of the tidal basin.

Lights.—Light-buoys.—A light is exhibited, at an elevation of 30 feet (9m1), from a white square framework structure, 24 feet (7m3) in height, situated near the extremity of the breakwater extending from Sa tō.

Leading lights are exhibited at the western end of the city of Chemulpho. The front light is exhibited, at an elevation of 45 feet (13m7), from a white square framework structure, 41 feet (12m5) in height, situated nearly one mile north-eastward of Shō-Getsubi tō lighthouse; the rear light is exhibited, at an elevation of 153 feet (46m6), from a white square framework structure, 75 feet (22m9) in height, situated nearly 2½ cables north-eastward of the front light. These two lights in line, bearing 042°, lead through the fairway of the Inner harbour channel.

A light is exhibited from a post on a godown at the head of the tidal basin.

A light-buoy, No. 3, painted red, and exhibiting a *red flashing* light *every three seconds*, is moored about 4 cables north-eastward of Shō-Getsubi tō lighthouse (*Lat. 37° 28′ N., Long. 126° 36′ E.*) and on the south-eastern side of the Inner harbour channel. A light-buoy, No. 4, painted black, and exhibiting a *white flashing* light *every three seconds*, is moored about 6 cables north-eastward of Shō-Getsubi tō lighthouse and on the north-western side of this channel.

Chart 1258.

Directions.—Vessels of deep draught making for Chemulpho may

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Chart 1258.

use either Higashi suidō (page 481) or Nishi suidō (page 484), but owing to the numerous dangers and the strong tidal streams, caution is necessary. Higashi suidō is the channel usually taken, and it can be navigated at night; although it has more dangers in it than Nishi suido, the tidal streams are not so strong and never exceed 4 knots. Small vessels with local knowledge, approaching from the north-westward, sometimes enter Nishi suidō by crossing the bank between Tokuseki tō and Sōchi guntō in a position about 3 miles south-westward of the latter; *see* page 484.

Approaching either Higashi suidō or Nishi suidō, vessels from the southward should proceed through the channel westward of Ō tō (page 474), or pass westward and northward of Kakureppi rettō (page 475), and should then shape course to pass about 1¾ miles north-westward of An tō (page 477). Vessels from the northward or north-westward should pass southward of Mokutoku tō (page 479) and then steer an east-north-easterly course for Chōan sho (page 481).

Chart 1270.

Higashi suidō.—From a position about 1¾ miles north-westward of An tō a north-easterly course should be steered direct for Chōan sho, and when about 5¼ miles north-westward of the wooded summit of Ōgon tō (page 477) the group of trees on Kokushi hō, the summit of Reikō tō (page 482), will be seen in line with the lighthouse on Fu tō (page 481), bearing 038° (*see* view facing page 490); this mark should be steered for, passing between Chōan sho light-buoy and the 28-foot (8m5) patch lying about one mile north-westward of this rock. It has been reported that Kokushi hō is liable to be obscured by haze at any time of the year. When the summit of Jō-Kōkei tō bears 310°, course should be shaped to pass between Fu tō and Kon tō, and, when through this channel, steering again for the group of trees on Kokushi hō bearing 038°, and with Fu tō lighthouse astern, bearing 218°. When south-eastward of Haku gan lighthouse steer a northerly course so as to pass about 4 cables eastward of it, and when Hachibi tō lighthouse is in line with Hoku-Chōshi sho lighthouse, bearing about 043°, shape course to pass about half a mile north-westward of the latter and thence an east-north-easterly course to pass about half a mile southward of Hachibi tō.

Chart 3642, plan of Chemulpho harbour, and 1270.

From the position about half a mile southward of Hachibi tō steer 034°, and a useful mark for this purpose is a tall white house with a square tower and a red roof, situated on the 289-foot (88m1) hill about 1¼ cables north-eastward of Chemulpho rear leading light; the observatory (*Lat. 37° 28′ S., Long. 126° 38′ E.*) is situated nearly 2 cables north-eastward of this house, but is on a lower hill, and it is stated that it cannot be identified from seaward. Continue on this course until the group of trees on the summit of Ritsu tō is in line with the beacon on the western side of Getsubi tō, bearing 021°, which leads to the anchorage.

The season of fog is during May and June, and fog may always be expected outside Chemulpho before and after sunrise; the afternoon is the best time for going in. The bottom between Fu tō and Haku gan is foul, and it would be dangerous to anchor there in fog.

Between Reikō tō and Hoku-Chōshi sho vessels are liable to be set

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Chart 3642, plan of Chemulpho harbour, and 1270.

eastward by the tidal stream during the rising tide, and westward during the falling tide, the effect of the latter being the stronger of the two.

Near Chōan sho the tidal streams set across the track shown on the chart, and fog is liable to come on suddenly; the *red* sector of Fu tō lighthouse is weak, and at night vessels may be unexpectedly close to Chōan sho before this light is sighted; for these reasons it is reported that the pilots do not follow the charted track after embarking at An tō, but pass north-westward of the 28-foot (8^m5) patch lying about one mile north-westward of Chōan sho, and then pass between this patch and Ka-Kōkei tō. Provided that Chōan sho light-buoy is in position, however, there should be no difficulty in following this track.

Charts 1270, 1258.

Nishi suidō.—Vessels intending to pass through Nishi suidō should make for a position about 3 miles south-eastward of I tō (page 480), and then steer a north-easterly course until the summit of Bunkō tō is in line with the eastern extremity of Senkō tō, bearing about 003°, when the summit of Soya tō should be steered for, bearing 017°, which leads about 1½ miles eastward of Gyūtō gan.

When the 290-foot (88^m4) high peak on the western end of Shigetsu tō is in line with Dōhaku tō, bearing 043° (*see* view facing this page, steer for them until within about 1½ miles of Dōhaku tō, when steer for the western extremity of Shō-Sōchi tō, bearing 026°, which leads in mid-channel between Dōhaku tō and Soya tō; the tidal streams here are very strong, sometimes attaining a rate of 5 knots. Continue on this last course until Bokutō tō bears 084°, distant about 1½ miles, when course should be altered to 051° so as to pass about one mile south-eastward of Shō-Sōchi tō. When the peak on the northern extremity of Tokuseki tō is in line with the southern extremity of Shō-Sōchi tō, bearing 253° (*see* view facing this page), keep this mark on astern, which leads between the banks extending north-eastward from Shigetsu tō and that connecting Sōchi guntō and Dai-Bui tō. When the western extremity of Dai-Bui tō bears 006°, course should be altered for a position about a half a mile southward of Hachibi tō, thence vessels should follow the directions given for Higashi suidō.

Pilots.—The employment of a pilot is optional. Application for a pilot can be made to the office of the Pilots' Association, giving probable time of arrival off I tō or An tō (*Lat. 36° 58′ S., Long. 126° 10′ E.*). Vessels should wait for the pilot to come on board off An tō, or, if he is only required to take the vessel from the harbour limits into the tidal basin, off Shō-Getsubi tō lighthouse.

Chart 3642, plan of Chemulpho harbour.

Dredger signals.—The dredger working in the channel of the Inner harbour will exhibit the following signals:—

Day signal.	*Night signal.*	*Signification*
A red flag.	Two *red* lights, disposed vertically, below her anchor lights.	Incoming vessels must keep the dredger on their starboard hand; outgoing vessels must keep the dredger on their port hand.

Charts 1256, 3480, 1262.

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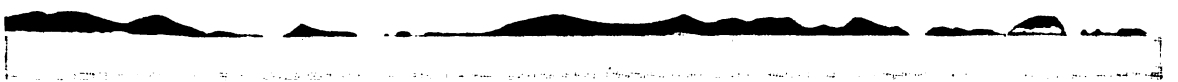
To face page 490.

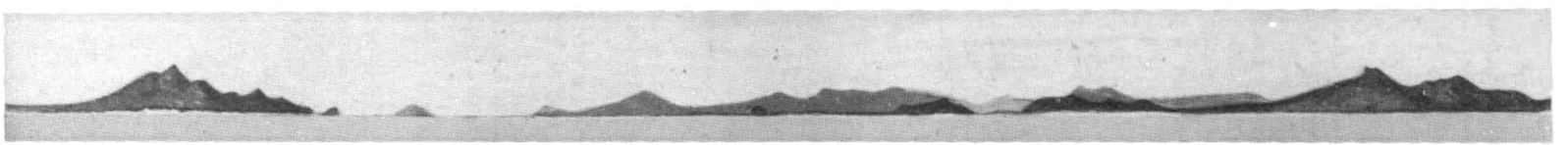
APPROACHES TO CHEMULPHO



Summit of Reiko tō in line with Fu tō, bearing 038°.

Leading mark for Higashi suidō.

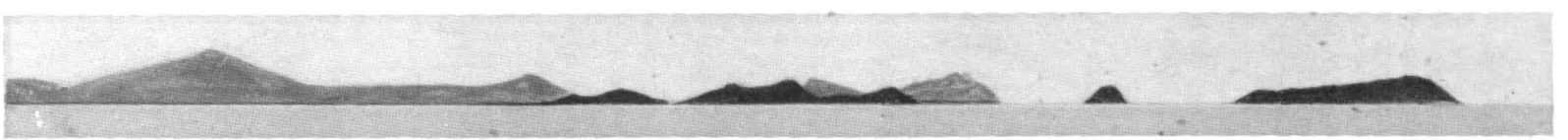
Shigetsu tō.



Soya tō. *Dōhaku tō.*

286-foot high hill on Shigetsu tō in line with Dōhaku tō, bearing 043°.

Zenbi tō



Tokuseki tō. *S. extremity of Shō-Sōchi tō.* *Sōchi gundō.*

Peak on northern extremity of Tokuseki tō in line with southern extremity of Shō-Sōchi tō, bearing 253°.

Two views of the leading marks for Nishi suidō.

(Originals dated 1884).

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Chart 3642, plan of Chemulpho harbour.

A white flag.	Two *green* lights, disposed vertically, below her anchor light.	Incoming vessels must keep the dredger on their port hand; outgoing vessels must keep the dredger on their starboard hand.

Dock signals.—Signals are made to vessels for entering or leaving the dock or basin at Chemulpho by means of flags or lights, disposed vertically, hoisted at the signal mast on the northern side of the entrance to the lock gate, as follows:—

1. When the lock gate is open:—

Day signal.	*Night signal.*	*Signification.*
A red triangular flag above a white triangular flag.	A *red* light above a *white* light.	Enter the dock.
A white triangular flag above a red triangular flag.	A *white* light above a *red* light.	Leave the dock.

2. When the lock gate is closed:—

Day signal.	*Night signal.*	*Signification.*
A red square flag below two white square flags.	A *red* light below two *white* lights.	Enter the dock immediately.
A red square flag between two white square flags.	A *red* light between two *white* lights.	Leave the dock.

3. When entering or leaving the dock is suspended:—

Day signal.	*Night signal.*	*Signification.*
Three red square flags.	Three *red* lights.	Entering the dock is suspended.
Two red square flags.	Two *red* lights.	Leaving the dock is suspended.

When a vessel inside the dock is about to leave her position she must sound one long blast of about ten seconds duration on the siren ten minutes before moving.

Harbour facilities.—Fresh provisions are plentiful. Water is laid on to the tidal basin; vessels outside can be supplied from a tank-vessel or from water-boats.

Large quantities of coal can be supplied on demand.

Small repairs can be carried out, and there is a slip capable of taking a vessel of 300 tons.

There is a 30-ton floating crane in the basin, and several smaller fixed cranes.

Two small steam tugs and numerous lighters are available.

There are two well-equipped hospitals; one of these, for infectious cases, can accommodate 122 patients.

Typhoon signals (*see* page 34) and Local storm warning signals, classes 1, 2, and 3 (*see* page 38), are displayed from a signal station situated about 4 cables north-eastward of the entrance to the tidal basin (*Lat. 37° 28′ N., Long. 126° 37′ E.*).

Chemulpho is connected to the Korean railway system, and it is connected to the general telegraphic and telephonic systems.

Charts 1270, 1258, 1256, 1262.

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Chart 3642, plan of Chemulpho harbour.

There is frequent steamer communication with North China, Japan, and other ports in Korea.

Trade and shipping.—The principal exports are rice, soya beans, hides, and charcoal; imports are wheat, sugar, oils, textiles, coal, cement, etc.

In 1934, 4,980 steam vessels, totalling 1,462,642 tons, entered the harbour.

City of Chemulpho.—The city of Chemulpho, known as Jinsen by the Japanese, is divided by a hilly ridge running in an east and west direction; the south-western part is the Japanese quarter, and the north-eastern part the Korean quarter. A British Consular officer resides here.

In 1935 the population was 82,997.

Chart 1258.

RIVERS ABOVE CHEMULPHO.—En ka.—The En ka branches off from the Kan kō about 20 miles northward of Chemulpho, and the channel winds between numerous rocks and sandbanks. For a distance of about 7 miles above Eisō tō there are depths of from 5 to 10 fathoms (9^{m}1 to 18^{m}3) in the narrowest parts of the channel, and from 2 to 3 fathoms (3^{m}7 to 5^{m}5) in the wide parts, but above that it becomes shallower; the banks are mostly lined with paddy fields, with hills behind them on the mainland side. Several promontories, with old forts on them, project from the eastern side of Kōka (Kang Hwa) tō, which forms the western side of the river.

The tidal streams in the narrowest parts attain a rate of 8 knots at spring tides, and, except with thorough local knowledge navigation is very difficult. The fogs, which occur from May to August are an additional danger, and they frequently last for two or three days. The channel is marked by buoys and beacons, but these are liable to be shifted or swept away by floods and other causes; the buoys are removed from the latter part of November until the middle of March. In 1933, small vessels not exceeding 7 feet (2^{m}1) in draught could pass through the river.

Kan kō.—The Kan kō (Han gan) is formed by the confluence of two rivers, which unite near Kōan, situated about 15 miles eastward of Seoul (*Lat. 37° 35′ N., Long. 126° 58′ E.*). From this junction the river flows westward, passing along the southern outskirts of Seoul, and then turns north-westward; about 20 miles below Seoul it is joined by the Rinshin kō (Chang tan kai), which flows in from the northward, and it then bends westward. After about 6 miles it divides into two, the southern branch being the previously described En ka, whilst the main branch continues westward, passing northward of Kōka tō, where it is joined by the Reisei kō (Yesan kan), and thence into the sea.

The banks are mostly steep and well wooded; the fairway is lined on both sides by mud flats which dry. The bed of the river changes from time to time, expecially during the rainy season, and its navigation requires great caution; it is mostly used by sailing craft not exceeding 5 feet (1^{m}5) in draught. The river freezes over in winter.

The approaches to the Kan kō from the westward are described in Chapter XI, commencing at page 499.

Seoul.—Seoul, named Keijō by the Japanese, is the capital of

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Chart 1258.

Korea, and is the seat of the Governor General. The population at the end of 1932 was 374,909.

There is a W/T station at Seoul; *see* page 42.

Charts 3642, plan of Gazan byōchi and approaches, and 1270.

GAZAN BYŌCHI AND APPROACHES.—On the eastern side of Higashi suidō is the mouth of a gulf which extends about 20 miles in an easterly direction and forms the approach to Gazan byōchi. Hō tō, situated about 2¼ miles south-eastward of Fu tō (page 481), and the islets and banks extending eastward from it, divide the gulf into two channels, the northern of which, being wider and less obstructed by banks, is the one most generally used.

Chart 1270.

Southern channel.—The southern channel leading to Gazan byōchi is approached by passing northward of Chōan tai (page 477), and is entered between Dai-Ranshi tō (page 478), the largest island off the entrance to Tokugan po, and Hō tō (page 481).

Chart 3642, plan of Gazan byōchi and approaches.

Roku tō is the name given to a group of five islets, the central and largest of which, named Roku tō, with a small group of trees on its summit, lies nearly 2¾ miles eastward of Hō tō; the two northern islets of the group are named Matsuroku tō, and the two southern are Chūroku tō and Biroku tō. Between the three northern islets of the group and the bank extending eastward from Hō tō there is a narrow passage with depths of from 8 to 10 fathoms (14^{m}6 to 18^{m}3). The tidal streams amongst these islets are very strong.

Sekimon kaku (*Lat. 37° 03′ N., Long. 126° 30′ E.*), about 2 miles south-eastward of Biroku tō, is the extremity of a peninsula connected to the mainland about 1¾ miles south-eastward of this point by an isthmus about 1½ cables wide. Sekimon san is a pointed peak immediately northward of the isthmus; the summit of the peninsula is 273 feet (83^{m}2) high, and is thickly wooded with pine trees. Toshinkyoro is a reef which extends nearly 1½ miles north-north-eastward from Sekimon kaku; there are two or three rocks above water on it, and on the outer extremity is a rock 80 feet (24^{m}4) high. The channel between this rock and Biroku tō is nearly one mile broad, with depths of from 10 to 20 fathoms (18^{m}3 to 36^{m}6). The northern and north-eastern sides of the peninsula are fringed by a reef which dries.

Rippa tō lies with its southern extremity about 2¾ miles north-eastward of Sekimon kaku; its summit, which is situated in the northern part, is a good mark for the channel. A bank, which partly dries, extends about 3¾ miles westward from Rippa tō, leaving only a narrow channel between its extremity and Matsuroku tō. A bank, with depths of less than 3 fathoms (5^{m}5) over it, extends about one mile eastward from Rippa tō. Kakusan sho, a rock 19 feet (5^{m}8) high, lies nearly three-quarters of a mile north-westward of the north point of Rippa tō.

Kikka tō consists of three islets lying on a bank which dries; the northern islet is 104 feet (31^{m}7) high and lies about 1½ miles south-south-eastward of the southern extremity of Rippa tō. A rock, which dries, lies about one cable southward of the southern islet. A bank, with depths of less than 3 fathoms (5^{m}5), extends about 3 miles west-

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Chart 3642, plan of Gazan byōchi and approaches.

north-westward from Kikka tō, leaving only a narrow channel between its extremity and Toshinkyoro.

Chōkokō kaku is situated about 1¾ miles south-eastward of Sekimon san, and the bight between is occupied by a mud bank which dries. Between Chōkokō kaku and Jōkyūbi, a point situated about 7 miles east-south-eastward, is a bay entirely filled by a mud flat which dries, and which is intersected by the outlet of a small river; a rock, which dries 22 feet (6^{m}7), lies about one mile south-eastward of Chōkokō kaku and on the outer edge of this bank. There are numerous long rows of fishing stakes along the outer edge of this bank.

Chū-ō sentai, a bank which dries, extends about 3 miles south-eastward from a position about 3¼ miles north-eastward of Chōkokō kaku, and there are depths of less than 2 fathoms (3^{m}7) for a distance of nearly 3 miles farther south-eastward. The passage between the north-western end of Chū-ō sentai and Kikka tō is almost entirely occupied by banks with depths of less than 3 fathoms (5^{m}5), with two patches which dry.

Chart 1270.

Northern channel.—The northern channel leading to Gazan byōchi is entered from the westward between Hō tō and Fudō sho, a rock, which dries 21 feet (6^{m}4), lying about 2¾ miles north-eastward. The channel then runs along the northern side of the banks between Hō tō and Rippa tō, and northward of Kakusan sho.

Chart 3642, plan of Gazan byōchi and approaches.

Tōri tō (*Lat. 37° 07′ N., Long. 126° 37′ E.*) is a small islet, precipitous on its western side, lying about 3½ miles eastward of the northern extremity of Rippa tō; Tōri sentai, a bank which dries, extends about 2½ miles eastward from this islet to within about half a mile of Shinri kaku, the northern entrance point to Nanyō wan. A rock, which dries one foot (0^{m}3), lies about a quarter of a mile southward of Tōri tō, with another rock between. Shō-Tōri tō is a rock, 32 feet (9^{m}8) high, lying about 2 cables northward of Tōri tō; a ledge, with a rock which dries 24 feet (7^{m}3) on its outer end, extends about 3 cables north-westward from Shō-Tōri tō. The northern channel to Gazan byōchi passes between Rippa tō and Tōri tō, and thence north-eastward of Chū-ō sentai.

Nanyō wan is entered between Shinri kaku and Ko-onri, a point about 5¾ miles south-eastward; a mudbank dries out for nearly 4 miles north-westward of Ko-onri and about half a mile southward. Several islets and rocks lie on this mudbank westward of the point; Kyoku tō is the westernmost of these. A detached shoal, with a depth of 2½ fathoms (4^{m}6) over it, lies about 1½ miles west-south-westward of Ko-onri.

Gazan byōchi.—Dangers.—The entrance to Gazan byōchi lies between Jokyūbi and the mudbank which extends from Ko-onri. Bō tō is the name given to a group of rocks above water lying about midway between these two points; the highest of these is 43 feet (13^{m}1) high, and a shoal, with depths of less than 3 fathoms (5^{m}5), extends about 6 cables north-westward of it. A rock, which dries 8 feet (2^{m}4), lies about 2 cables westward of the 43-foot (13^{m}1) high rock, and about a quarter of a mile south-westward of the latter is a rock 3 feet (0^{m}9) high; there is a narrow passage, with depths of not less than 3 fathoms (5^{m}5), between the shoal around Bō tō and

Charts 1258, 1256, 3480, 1262.

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Chart 3642, plan of Gazan byōchi and approaches.

that which extends south-eastward from Chū-ō sentai. A reef, which dries 25 feet (7m6), lies nearly 1¼ miles southward of Ko-onri, and about half a mile eastward of this reef is another reef, which dries 8 feet (2m4).

The southern side of Gazan byōchi is bounded by the mudbank which occupies the entire bay between Jokyūbi and Kanshin kaku, situated about 4 miles east-south-eastward; Nai tō is situated on the northern edge of the bank and about midway between these two points. Kanshin ri is a small village situated on the eastern side of Kanshin kaku. The northern side of Gazan byōchi is bounded by the shoal flats which extend south-eastward from a position about one mile southward of Ko-onri to Robi kaku, which is situated about 1¼ miles northward of Kanshin kaku.

Shōgaku (Shūgaku) san is a peak nearly 3 miles south-westward of Kanshin kaku, and about 2½ miles westward of Shōgaku san is a peak 348 feet (106m1) high, with an ancient, conspicuous fire beacon on top. Robi san, 350 feet (106m7) high, is situated about one mile north-eastward of Robi kaku.

The depths throughout the greater part of Gazan byōchi vary between 7 and 10 fathoms (12m8 and 18m3), rock or sand, the tidal streams are strong, and sometimes attain a rate of 3½ knots. A shoal, with a least depth of 25 feet (7m6) over it, lies about half a mile south-eastward of the 43-foot (13m1) high rock of Bō tō, and a 33-foot (10m1) patch lies about 1¼ miles south-eastward of the same rock. A rock, which dries 20 feet (6m1), lies about 4 cables northward of Kanshin kaku, and there is foul ground, with some rocks which dry, for about 1¼ miles east-south-eastward of this rock.

Gazan naikō.—Beacon.—The channel from Gazan byōchi continues for a further 4½ miles south-eastward from Robi kaku, with depths of from 4 to 10 fathoms (7m3 to 18m3), thus forming an inner harbour. The north-eastern shore is fringed by mud flats which dry, and on the south-western side of the channel are numerous banks, some of which dry. Ei gan is a conspicuous, pointed rock, 43 feet (13m1) high, lying nearly 1¼ miles east-south-eastward of Kanshin kaku. Kōtan (Kotaku) tō is situated about 2 miles south-eastward of Kanshin kaku (*Lat. 36° 58′ N., Long. 126° 47′ E.*) and is surrounded by a mudbank which dries. The space between Kōtan tō and Kanshin kaku is almost entirely occupied by a bank which dries, leaving only a narrow and shoal channel on its western side; the southern extremity of this bank is marked by a black beacon, with an octagonal concrete base, surmounted by a sphere.

South-eastward of Kōtan tō the bay widens out, but becomes very shoal, and at Shinjō kaku, a low point about 4½ miles south-eastward of Kōtan kaku, where the bay divides into two arms, it dries almost entirely.

Charts 3642, plan of Gazan byōchi and approaches, and 1270.

Tidal streams.—About 2 miles northward of the line joining Hō tō and Rippa tō the tidal streams run eastward and westward, turning at about the times of high and low water; the maximum rate is 4½ knots. From one to 4 miles eastward of Rippa tō the tidal streams run south-eastward and north-westward.

At Gazan byōchi the tidal streams run east-south-eastward and west-north-westward, turning at about the times of high and low water; the maximum rate is 3 knots.

Charts 1258, 1256, 3480, 1262.

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Charts 3642, plan of Gazan byōchi and approaches, and 1270.

Directions.—Vessels proceeding to Gazan byōchi by the northern channel should pass about one mile northward of Hō tō, and steer an easterly course to a position one mile northward of Kakusan sho; thence steer 118°, and when one mile southward of Tōri tō course should be altered to 135° for the 3-foot (0m9) high rock at the south-western end of Bō tō, thus passing between the shoal which extends north-westward of Bō tō and the south-eastern end of the shoal which extends south-eastward from Chū-ō sentai. Pass fairly close south-westward of the 3-foot (0m9) high rock and then proceed eastward to the anchorage, taking care to avoid the shoal, with a least depth of 25 feet (7m6) over it, lying about half a mile south-eastward of Bō tō.

As the passage westward of Bō tō is very narrow, and a depth of not more than about 4 fathoms (7m3) can be carried through it, the route just described is only suitable for vessels of moderate size. There are greater depths in the fairway of the southern channel, but local knowledge is required by vessels using it.

COAST BETWEEN GAZAN BYŌCHI AND CHEMULPHO.—The coast between Gazan byōchi and Chemulpho consists of several peninsulas, and is deeply indented by bays, although these are almost entirely occupied by flats which dry. Numerous islands, islets and rocks lie on the large banks which extend from this coast and dry. *Chart 3642, plan of Gazan byōchi and approaches.*

Funyō wan.—The entrance to Funyō wan is on the northern side of Gazan byōchi, between Robi kaku and Ko-onri. This bay penetrates the land for about 10 miles and has numerous arms, but there is only a narrow, shallow channel through the mud flats. A reef extends about 3 cables from the western side of Robi kaku and there are two rocks on it; the western rock is 52 feet (15m8) high and appears white. Dokuhi tō consists of two islets lying on the edge of the mud flat on the northern side of the channel and about one mile within the entrance.

Nanyō wan.—Nanyō wan, north-westward of Funyō wan, runs in a north-easterly direction for nearly 10 miles. Nanyō kaku is situated about 5 miles north-eastward of Shinri kaku, and between these two points is a gradually narrowing channel, with depths of from 4 to 1½ fathoms (7m3 to 2m7), between the mudbanks on either side. Nanyō kaku divides the bay into two arms, and the village of Nanyō, situated on the northern arm, is reached by landing at that point.

Nanyō hantō (Suigen), the southern extremity of which is Shinri kaku, separates Nanyō wan from the large bay southward of Chemulpho and is joined to the mainland by an isthmus, about 1¼ miles wide, at the head of the northern arm of Nanyō wan. Kaiun san (*Lat. 37° 08′ N., Long. 126° 43′ E.*), situated in the southern part of this peninsula and about 1¾ miles north-eastward of Shinri kaku, has a small group of trees on its summit and a single pine tree on its northern shoulder.

There is a channel, with depths of from 2 to 4¾ fathoms (3m7 to 8m7) in the fairway, between the northern side of Tōri sentai (page 494) and the coastal bank extending westward from Nanyō hantō; this channel leads into the entrance of Nanyō wan from the westward, but a rock, which dries 4 feet (1m2), lies at its eastern end

Charts 1258, 1256, 3480, 1262.

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Chart 3642, plan of Gazan byōchi and approaches.

and nearly half a mile southward of Shinri kaku. A rock 8 feet (2m4) high, with a rock awash about 2 cables southward of it, lies on the edge of the coastal bank on the northern side of this channel and about one mile south-westward of Seijo kaku, a point about 2¼ miles north-north-westward of Shinri kaku.

Chart 1270.

Islands and channels between Nanyō hantō and Reikō tō.—Saifu tō lies with its southern extremity about 1½ miles westward of Seijo kaku and on the coastal bank which dries out for about 2½ miles westward of this point; the summit of Saifu tō, 212 feet (64m6) high, is on its northern extremity, and there is also a wooded peak, 190 feet (57m9) high, in the centre of the island.

Mazan suidō is a narrow channel running in a general north and south direction between the coastal bank which extends westward from Nanyō hantō and the drying bank which surrounds Daifu tō, an island lying with its southern extremity nearly 3 miles west-north-westward of Saifu tō; it is approached from the southward over a bar, with a depth of about 2 fathoms (3m7), situated about 2 miles westward of the southern extremity of Saifu tō. The channel then leads between the northern extremity of Saifu tō and a reef, which dries 14 feet (4m3), situated about half a mile north-north-westward; beyond this the channel runs between various islets and rocks, and is only navigable by small craft with local knowledge. There are depths of from 3 to 7 fathoms (5m5 to 12m8) in the fairway for nearly 5 miles above the bar.

Daifu tō, the largest island in this neighbourhood, and several smaller islands and islets, lies on an extensive mudbank which dries; Ōgon san, the summit of Daifu tō, is situated in the northern part, and appears as a conspicuous sharp peak when seen from the westward, but is rounded when seen from northward or southward. A group of trees on a hill 111 feet (33m8) high, on the south-eastern promontory of Daifu tō, is a good landmark. A reef, which dries 8 feet (2m4), lies about 6 cables southward of the south point of the island and on the southern edge of the mudbank.

Reikō suidō, between the western side of the mudbank surrounding Daifu tō and the eastern side of the mudbank around Reikō tō (page 482), is much obstructed by reefs and banks, and is only available for vessels of very light draught. San sho consists of three islets lying in an east and west direction in the middle of the channel. Mōkyori batsu is a narrow bank which extends about 2½ miles west-south-westward from these islets; the channel lies westward of this bank and eastward of Rippyō sho, a rock which dries 12 feet (3m7), situated nearly one mile south-westward of the western San sho. There are several rocks on either side of the channel northward of San sho, and the positions of these are best seen on the chart. Sensai tō, situated on the mudbank on the eastern side of Reikō suidō, has its summit, 183 feet (55m8) high, close to its south coast; Soku tō (*Lat. 37° 14′ N., Long. 126° 31′ E.*) lies about 3 cables south-westward of the south-west point of Sensai tō. Ben tō, a small islet with a sharp peak, lies in the northern entrance of Reikō suidō; a sandspit extends about one cable south-eastward from this islet, and there is a deep channel between the sandspit and the north-western extremity of Takyūhō tō, situated about 4 cables south-eastward.

Charts 1258, 1256, 3480, 1262.

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Charts 1270, 1258

Bay northward of Nanyō hantō.—Northward of Nanyō hantō is a large bay which is entered between the northern part of Daifu tō and the flats which extend southward from Chemulpho. The greater part of this bay is filled by mudbanks which dry, only leaving some narrow winding channels between the banks. Two islets lie within the entrance; Ka-Kariki tō, the western, lies about 6 miles eastward of Hoku-Chōshi tō, and Jō-Kariki tō lies about 3 cables east-south-eastward of Ka-Kariki tō. A bank, with depth of 3 fathoms (5^{m}5) and less, extends about 5½ miles westward from these islets, almost reaching Nan-Chōshi sho (page 482); a similar bank extends eastward from them, and joins that which extends from the mainland.

Several islets lie on the mudbanks within the bay. Ukyo tō (Grivel islet), the largest of these, is situated nearly 4½ miles east-north-eastward of Ka-Kariki tō and has a group of trees on its summit; Gyokukō tō lies about 3 cables north-eastward of Ukyo tō. Kō tō (Cheudi) is situated about 3 miles southward of Ukyo tō and has a sharp, rocky summit; Gyūon tō lies nearly 3 miles eastward of Kō tō, and has a group of trees on its summit. Bunkaku san (Mount Zoe), on the northern side of the bay, has a sharp, rocky summit 744 feet (226^{m}8) high, and is a good landmark.

Charts 1256, 3480, 1262.

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CHAPTER XI.

THE EASTERN SIDE OF HWANG HAI OR YELLOW SEA.—THE WEST COAST OF KOREA, FROM THE KAN KŌ TO THE ŌRYOKU KŌ.

Chart 1258.

WESTERN APPROACHES TO KAN KŌ.—Between Tokuseki guntō (page 479) and Enhei rettō (Yonpyon islands), situated about 37 miles northward of the south-western group of Tokuseki guntō, there are two deep channels leading to the outer part of the estuary of the Kan kō; the south-eastern of these leads to Chōhō suidō, and the north-western leads to Sekimo suidō and Kyōdō suidō. Chōhō suidō is a cul de sac, as it narrows and shoals at its north-eastern end, and there is only a passage for small craft at high water into the En ka. Sekimo suidō and Kyōdō suidō unite off the north-western side of Kōka tō, but only small vessels with local knowledge can reach the Kan kō by this route.

Charts 1270, 1258.

Southern channel.—Chōhō suidō.—Kasan tō (*Lat. 37° 11′ N., Long. 125° 55′ E.*) and Kutsugyo tō, with the bank lying northward of the latter (*see* page 480), lie on the southern side of the entrance to the southern channel, which terminates north-eastward in Chōhō suidō; the channel then runs north-eastward along the northern side of Zenbi tō (page 481) and the banks between this island and Ryūyū tō (page 485). The northern side of the channel is formed by numerous banks, which dry in parts, extending for nearly 30 miles in a south-westerly direction from Koka tō, the large island which forms the western side of the northern part of the En ka.

Chōhō suidō (Chambon channel) is about 1½ miles wide at its south-western entrance, between the north-western extremity of Ryūyū tō and a bank, which mostly dries, extending about 3½ miles south-south-westward from Chōhō (Chambon) tō, an island lying about 3 miles northward of Ryūyū tō; four small islets lie on this bank, and the highest of them, named A sho (Gagyu or Hau tō), is situated nearly 1¾ miles south-westward of the south-west point of Chōhō tō. A sand-bank, with depths of from half a foot to 2¼ fathoms (0m2 to 4m1) over it, lies off the entrance to Chōhō suidō, and extends about 2 miles south-westward from a position about 4 miles southward of A sho. Chōhō tō has a conspicuous wooded summit, 479 feet (146m0) high, in about the middle of the island; the coasts are mostly sandy beaches and low cliffs. A small sandbank, with a least depth of 2¼ fathoms (4m1) over it, lies on the eastern side of the fairway and about 1½ miles southward of the eastern extremity of Chōhō tō.

Charts 1256, 1262.

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Charts 1270, 1258.

Chōhō suidō widens out to about 5½ miles between the east point of Chōhō tō and the north-west point of Eisō tō (page 485), but it is greatly obstructed here by islands, islets, and banks. Shin tō (Felicie island), the largest and eastern of these islands, is separated from the northern side of Sanboku tō (page 485) by a channel about one mile wide, with depths of from 4 to 5 fathoms (7m3 to 9m1) in the fairway, but there are many rocks in the eastern entrance, and a rock, with a depth of 6 feet (1m8) over it, lies in the middle of the western entrance. Shi tō and Bō tō (Chabannes islands) lie close together westward of Shin tō; Shi tō is connected to Shin tō by a mudbank which dries, and there is a group of trees on its summit. Bō tō is separated from the western side of Shi tō by a narrow channel with a least depth of one foot(0m3). Fu tō, a thickly wooded islet 118 feet (36m0) high, lies in about the middle of the channel between Bō tō and the eastern extremity of Chōhō tō; there is a deep passage on either side of this islet, but rocks, which dry, extend about 3 cables from its southern end. After passing between Chōhō tō and Bō tō the main channel of Chōhō suidō turns eastward between the northern sides of Shi tō and Shin tō and the bank which extends southward from Koka tō, but it becomes very narrow and shoal.

The tidal streams in Chōhō suidō run north-east and south-west, turning about half an hour after high and low water at Chōhō tō; their maximum rate is about 3 knots, except between Chōhō tō and Fu tō, where they may attain a rate of 6 knots.

Chart 1258.

Northern channel.—Sekimo suidō and Kyōdō suidō.—Buoys.—The northern channel of approach to the Kan kō is separated from the southern channel by the banks which extend about 30 miles south-westward from Koka tō; the northern side of this channel is bounded by banks which extend in a north-easterly direction to the coast from a position about 13 miles south-south-westward of Enhei rettō. Shin tō (Saru somu) is an isolated islet lying on the southern side of the channel and nearly 14 miles westward of the south-western extremity of Chōhō tō; it has a flat summit 128 feet (39m0) high, covered with grass and trees, and is frequented by innumerable sea birds. Shin tō (*Lat. 37° 31′ N., Long. 126° 03′ E.*) lies on the north-western edge of a bank which dries, and there is a deep channel close westward of the islet. A bank, which dries over one portion and has depths of less than 3 fathoms (5m5) over the remainder, extends about 3½ miles south-westward from a position nearly 1½ miles south-westward of Shin tō. Gū tō (Moro somu), about 7 miles north-north-westward of Shin tō and on the northern side of the channel, is an islet 243 feet (74m1) high with a conspicuous group of trees on it; a rock, which dries 6 feet (1m8), lies close off its eastern side. Gū tō is surrounded by banks which dry, and on the bank westward of the islet are four rocks; Seki tō, the outermost of these, lies about three-quarters of a mile south-westward of Gū tō and is 46 feet (14m0) high.

Ban tō consists of two islets lying on a sandbank, which dries, on the southern side of the approach channel to Sekimo suidō; Tōban tō, the south-eastern islet, lies about 2 miles west-south-westward of the north-west point of Chōhō tō and is 305 feet (93m0) high. Sandbanks, which partly dry, lie within a distance of 1½ miles north-westward and 2 miles north-eastward of Ban tō. Chūmon (Shomon)

Charts 1256, 1262.

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Chart 1258.

tō lies about 4½ miles north-westward of Chōhō tō and on the northern side of the approach channel to Sekimo suidō; it has a conspicuous rounded summit, 467 feet (142m3) high, and the coasts are mostly sandy beaches, with occasional cliffs. A sandbank, which dries, extends about 4 miles south-westward from Chūmon tō, and Funshi tō, a small islet 87 feet (26m5) high, lies on the western edge of this sandbank. Sushi tō, 86 feet (26m2) high, lies about half a mile south-eastward of the south-east point of Chūmon tō and is connected to it by a reef which dries. Manderi shō, a rock which dries 18 feet (5m5), lies about 1½ miles south-south-westward of the south-east point of Chūmon tō and nearly in the middle of the entrance to Sekimo suidō.

Ashi tō, with a conspicuous clump of trees on the hill on its western end, lies about 2 cables northward of Chūmon tō, and the channel between is so encumbered with rocks that it is not even suitable for boats. Pōrūmu tō lies about three-quarters of a mile north-westward of Chūmon tō and is surrounded by sandbanks which dry. Kutsu (Kuchomu) tō lies about half a mile north-westward of Pōrūmu tō, and there are two rocks, which dry, in the channel between; its summit, near the western end of the island, is 347 feet (105m7) high and has a conspicuous group of trees on it.

Kōka (Kang hwa) tō is the large island which divides the Kan kō into two branches: En ka on the eastern side, and the main stream on the northern side of the island. There are four ranges of hills on the island, all of which run in an east and west direction. Maji san, the summit of the island, is situated in the middle of the southernmost range and is 1,551 feet (472m7) high; it is the most important mountain in this district, and when seen from the eastward or westward appears as a sharp, rocky peak, whilst from the northward or southward it shows a double peak. Chinkō san (Baron peak), about 3½ miles northward of Maji san, rises abruptly from the plain, and appears as an island when seen from the westward. Ketsukō san, about 3 miles northward of Chinkō san, is a flat-topped mountain 1,516 feet (462m0) high. Betsuritsu san, an isolated peak 1,298 feet (462m1) high, situated near the north-west point of the island, is a good landmark. Hoten san, about 2 miles east-north-eastward of Betsuritsu san and 941 feet (286m8) high, is rendered conspicuous by a heap of stones on the western side of its summit. The coasts of the island are mainly cliffy, but are not precipitous; Tōken tō, close off the south-east point, appears as part of the main island. A bank, which dries, extends from the south coast, and almost connects with that extending from the northern side of Chōhō tō and Shin tō.

Sekimō (Meioumu) tō lies on the western side of Sekimo suidō, with its south-eastern extremity about 1¾ miles northward of Chō kan, the western extremity of the southern part of Kōka tō; hills rise from the northern and south-eastern sides of the island, with low, flat land between, so that it appears as two islands from a distance. Kaimei san, the summit of the island, is situated near the south-eastern extremity and is 1,060 feet (323m1) high; thence a rugged, rocky ridge extends north-westward to Jōhō san, 1,023 feet (311m8) high, from which it descends gradually to Nan kan (*Lat. 37° 43′ N., Long. 126° 16′ E.*), the west point of the island. Gyoyūsei tō, a flat-topped island 243 feet (74m1) high, sparsely covered with pine trees, lies on the mud flat which extends about 1½ miles southward from the south-

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eastern part of Sekimō tō: a rock, which dries 5 feet (1m5), lies about 2 cables off the south-east point of Gyoyūsei tō. Some banks, which dry, and several rocks, lie between Sekimō tō and Chūmon tō; Dai-Shō tō, a small islet 59 feet (18m0) high, lies about 1½ miles north-westward of Gyoyūsei tō and three-quarters of a mile off the south-west coast of Sekimō tō. Sei-Ken tō is a flat-topped island, 192 feet (58m5) high, lying about one mile west-north-westward of Nan kan; it is sparsely wooded with pine trees and has a few houses on it. A sandbank, which dries, extends about 2¾ miles southward and one mile northward from Sei-Ken tō; Sotsusatsu, 121 feet (36m9) high, and Nō tō, 75 feet (22m9) high, lie on this sandbank about half a mile northward and 4 cables westward, respectively, of Sei-Ken tō. Kika tō, 134 feet (40m8) high, lies about midway between the east point of Sei-Ken tō and Nan kan, and a rock, which dries 10 feet (3m0), lies 2 cables off the northern extremity of this islet. Mihō tō, 157 feet (47m8) high and sparsely wooded with pine trees, lies about three-quarters of a mile northward of Nan kan; three sandbanks, which dry, lie off its northern side. Shō tō, 88 feet (26m8) high, lies north-eastward of Mihō tō and about 3 cables off the north-west point of Sekimō tō. The channel between Sekimō tō and Sei-Ken tō is only suitable for boats.

Sekimō suidō (Meioumu channel) is the winding channel between the west coast of Koka tō and the east coast of Sekimō tō, and is entered from southward between Chō kan and Gyoyūsei tō; there are several islets and dangers in this channel, and the position of these can best be seen on the chart. Sekimō suidō is about 4 cables wide in its narrowest part, off the eastern extremity of Sekimō tō, and the tidal streams may attain a rate of over 6 knots here; elsewhere the maximum rate is from 3 to 4 knots. There is good anchorage for small vessels with local knowledge, in depths of from 3 to 4 fathoms (5m5 to 7m3), off the south-east point of Sekimō tō.

Kyōdō tō is a cultivated island lying with Kotō kan, its eastern extremity, about one mile westward of Inka kan, the north-west point of Kōka tō; Kotō kan is a reddish cliff 141 feet (43m0) high. Kagai san, 840 feet (256m0) high, the summit of the island, is situated in the south-eastern part, and appears as a sharp peak when seen from the eastward or westward. Suisei san, 425 feet (129m5) high, near the western extremity of the island, is rendered conspicuous by a pile of stones, 10 feet (3m0) high, on its summit. A rock, which dries 26 feet (7m9), lies about a quarter of a mile off Matsudan kaku, the west point of Kyōdō tō. Seishū shō (Chogushu tō) is a large sandbank, which dries, lying about one mile northward of the north-east point of Kyōdō tō.

Kyōdō suidō is the shoal channel running along the southern side of Kyōdō tō, and it connects with Sekimō suidō off the northern extremity of Sekimō tō; it has many dangers, its navigation is difficult, and it can only be reached by vessels not exceeding 12 feet (3m7) in draught. After passing through Kyōdō suidō the main channel is along the eastern side of Seishū shō to the mouth of the Reisei kō (Yesan kan), which flows out about 5 miles north-eastward of the north-east point of Kyōdō tō, and then steering south-eastward for the entrance of the Kan kō. The tidal streams in Kyōdō suidō run eastward with the rising tide and westward with the falling tide;

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in the eastern entrance the east-going stream meets the north-going stream from Sekimō suidō and thereby attains a maximum rate of over 5 knots; elsewhere the maximum rate of either stream is from 3 to 4 knots.

Kanboku tō (Cone islet) lies about 4½ miles north-north-eastward of Gū tō and on the edge of Kanrakusa (Kannakupuru), a large sandbank which extends about 9 miles south-westward from Ryūson kaku, a conspicuous headland 187 feet (57m0) high, with some rocks and trees on its summit, situated nearly 12 miles north-eastward of Gū tō; the southern edge of Kanrakusa forms the northern side of the approach to Kyōdō suidō, and for about 1½ miles offshore this sandbank only covers at spring tides. Ginten tō, a grass-covered islet 91 feet (27m7) high, lies about 1¾ miles north-westward of Kanboku tō. A red conical buoy, surmounted by a triangle, is moored about 2 miles west-south-westward of Ginten tō, and a similar buoy is moored nearly 2½ miles southward of this islet. A red conical buoy, surmounted by a triangle, is moored about 3 miles south-eastward of Ryūsan kaku, and marks the westernmost of three rocks which dry. All these buoys are removed when the ice forms.

Directions.—The entrance to the main channel leading to the Kan kō via Sekimō suidō or Kyōdō suidō is between Shin tō and Gū tō (page 500), where there is a depth of over 10 fathoms (18m3) in the fairway; Jōhō san, the central peak on Sekimō tō, bearing 057°, leads through clear of the banks which extend for over 20 miles south-westward of Gū tō. Only small vessels with local knowledge can proceed beyond the line joining Shin tō (*Lat. 37° 31′ N., Long. 126° 03′ E.*) and Gū tō, as the depths decrease north-eastward of this line, and there are numerous scattered banks.

Vessels intending to proceed through Kyōdō suidō turn northward from a position about midway between Shin tō and Gū tō, and pass fairly close eastward of the latter; the fairway here is, however, very narrow between the banks on either side, and local knowledge is essential.

COAST.—About 4½ miles north-westward of Ryūson kaku is a point covered with grass, and about 6 cables westward of this point is Baniho tō, an islet 143 feet (43m6) high; a rock, 5 feet (1m5) high, lies about 1½ miles south-eastward of Baniho tō, both being on Kanrakusa. Between the point just mentioned and Sōdō, a headland 140 feet (42m7) high situated about 4½ miles north-westward, is the entrance to a bay entirely occupied by sand and mudbanks which dry. Teibi (Chemii) is a point about 3¾ miles westward of Sōdō and appears as an island from a distance; a fall on its southern side shows red. Sand and mudbanks, which dry, extend about 11 miles south-south-westward from Teibi, and there are several islets and rocks on them; Ryūbai (Yogumai) tō, the largest of these, lies with its north-east point about 2½ miles southward of Teibi and has three peaks, with sandhills between them. Gari tō (Castle rock), about 7½ miles south-south-westward of Teibi, is the outermost islet.

Enhei rettō.—Enhei rettō (Yonpyon islands) is a group consisting of two islands and several islets and rocks; Shō-Enhei tō, the southern island, lies about 8½ miles south-westward of Gari tō and has a conspicuous conical summit. Jirō tō, a rock 24 feet (7m3) high, lies close

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off the north-east point of Shō-Enhei tō, and a bank, which dries, extends fully 1½ miles eastward from a position about 2 cables northward of this rock; a bank, with depths of less than 3 fathoms (5m5) and one portion which dries, extends north-eastward from Shō-Enhei tō until it joins the mudbank which extends from the mainland. Rō-un tō (Rorun toru), awash at high water, lies about 1½ miles southward of Shō-Enhei tō, and a rock, with a depth of one foot (0m3) over it, lies nearly 1½ miles westward of the island.

Dai-Enhei (Teyonpyon) tō, the larger of the two islands of the group, lies nearly 2½ miles north-north-westward of Shō-Enhei tō and is flat-topped. Kyūchi tō (*Lat. 37° 38′ N., Long. 125° 41′ E.*), an islet 115 feet (35m0) high, lies nearly one mile southward of Dai-Enhei tō, and Kachi tō, a rock 8 feet (2m4) high, lies nearly 1½ miles west-south-westward of Kyūchi tō, with a 2¾-fathom (5m0) patch between.

A bank, with depths of less than 3 fathoms (5m5), extends about one mile from the west coast of Dai-Enhei tō, and rocky ledges, with a rock which dries 18 feet (5m5) just outside them, extend about 3 cables north-westward from the north-west point of the island. A bank, with depths of less than 3 fathoms (5m5) over it, extends about 2 miles eastward from the north-east point of Dai-Enhei tō. Enhei ri is an important fishing village on the south-east coast of the island, and sand and mud flats, with some islets on them, dry out for about a mile from the village; Dō tō, an islet 121 feet (36m9) high, lies about half a mile south-eastward of the village, and is connected to the coast by a breakwater. From 1,500 to 2,000 fishing boats assemble here in the season, from April to June. In 1932, the population of Dai-Enhei tō was 1,100.

Mirikiri tō, an islet 91 feet (27m7) high, lies about one mile northward of Dai-Enhei tō, and Katsuri tō (Kaaryon), with two peaks, the higher being sharp and conspicuous, lies about 1½ miles westward of Mirikiri tō; some rocks lie within a distance of 4 cables southward of Katsuri tō, and within 3 cables southward of Mirikiri tō. A rock, with a depth of 1½ fathoms (2m7) over it, lies nearly one mile south-eastward of Katsuri tō.

Chōzai, an islet 134 feet (40m8) high, lies about one mile northward of Katsuri tō, and half a mile northward of Chōzai is an islet 96 feet (29m3) high; islets and rocks lie within a distance of three-quarters of a mile northward of the latter islet. The passage between Katsuri tō and Chōzai, and that between Chōzai and the islet northward of it, are encumbered with dangers, and neither of them should be attempted.

Tidal streams.—About 3 miles southward of Shō-Enhei tō the tidal streams turn anti-clockwise through 360° in 12 hours, and attain their maximum rate from 2 to 3 hours after high water. Observations made during spring tides show that the stream runs southward at low water at Shō-Enhei tō with a rate of nearly 1½ knots, eastward at 3 hours after low water with a rate of 2 knots, north-north-westward at high water with a rate of nearly one knot, and westward at 2 hours after high water with a rate of nearly 2 knots.

Local magnetic disturbance.—Shō-Enhei tō contains large quantities of iron, and a compass error of as much as 10° has been experienced near it.

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Kaishū wan.—Islets and dangers.—Light.—Buoys.—Kaishū wan (Haiju bay) penetrates the land for over 20 miles in a northerly direction from its entrance between Ryūbai tō and Dokujun kō, a point about 13 miles westward; Roku tō, an islet 106 feet (32m3) high, lies about 4 cables eastward of Dokujun kō, and foul ground extends for nearly half a mile southward from this islet. Owing to the shoals which extend from Ryūbai tō to Shō-Enhei tō, the only channels leading to the bay are between Mirikiri tō and Katsuri tō, or between Roku tō and the islets and rocks lying northward of Chōzai.

Within the entrance sand and mudbanks dry out from one to 6 miles from the eastern shore of the bay, and for as much as 3 miles off the western shore. In the southern part of the bay there are many banks, which dry, between those extending from either shore; through these banks there are two channels, each of them barely a cable wide in places.

The eastern shore of the bay, between Teibi and Ryūtō kaku, about 14½ miles north-westward, is low, except for a few hills in the northern part; the western shore is much higher, and is more indented. Ryūtō kaku and Shintō promontory, which extends from the western shore, narrow the bay to a width of about 4 cables, but within these points it widens out again to an inner bay, although the greater part of this dries.

Dai-Sui-ō tō lies about 6½ miles north-eastward of Chōzai, (*Lat. 37° 44′ N., Long. 125° 39′ E.*); its summit, 279 feet (85m0) high, situated on the southern side of the islet, appears like a whale's back when seen from the southward, and has a small group of trees on it. Shō-Sui-ō tō lies nearly 1½ miles north-north-westward of Dai-Sui-ō tō and is 133 feet (40m5) high. There is one channel eastward of these two islets, and two westward of them; these three channels unite northward of Shō-Sui-ō tō. Higashi suidō, the channel eastward of the islets, has a bar, with a least depth of 1½ fathoms (2m3) in the fairway, north-eastward of Shō-Sui-ō tō; it is, therefore, only suitable for small vessels, but it is stated to be frequently used by coasting vessels.

Chū-ō suidō, the central channel of the three, lies between the western side of Shō-Sui-ō tō and Ga gan, a rock 11 feet (3m4) high situated about half a mile westward. This channel is about 3 miles long and has depths of over 5 fathoms (9m1) in the fairway, but it is only from 1½ to 3½ cables broad; at its northern end the tidal streams may exceed a rate of 3 knots at spring tides. Shin shō, a reef which dries 9 feet (2m7), is situated nearly 2 miles south-south-westward of Shō-Sui-ō tō and on the northern end of a bank, which partly dries, extending in a south-south-westerly direction as far as Chōzai. A light is exhibited, at an elevation of 33 feet (10m1), from a black circular concrete structure, 52 feet (15m8) in height, situated on Shin shō. A red conical buoy, surmounted by a triangle, is moored about half a mile south-eastward of Shin shō light-structure. A rock, which dries 4 feet (1m2), lies about half a mile east-south-eastward of Shin shō light-structure. In 1928 the *Shinan maru* grounded on a sandy shoal, with a depth of 2 feet (0m6) over it, lying in the channel and about three-quarters of a mile north-north-eastward of Shin shō light-structure. A bank, which dries, extends for about 1½ miles south-westward of Shō-Sui-ō tō, and the depths are reported to be liable to change for about one mile further south-westward.

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Nishi suidō, the western channel, lies westward of the central banks and westward of Ga gan; at its northern end, at the extremity of a sandbank which extends nearly 2 miles northward from Ga gan, it is only about one cable wide, with depths of from 3¼ to 4¼ fathoms (5m9 to 7m8).

Northward of Shō-sui-ō the channel up the bay widens as far as Mangun kan, a point on the western shore and about 6 miles northward of Shō-sui-ō, and then gradually narrows. A rock, with a depth of 3 feet (0m9) over it, lies about 2 miles south-south-eastward of Mangun kan, and there are other rocks between this rock and the bank which extends from the eastern shore of the bay; a shoal, with a depth of 1¼ fathoms (2m3) over it, lies about 1¼ miles eastward of Mangun kan. Kaishū light-buoy, painted black, and exhibiting a *white flashing* light *every five seconds*, is moored about 1¼ miles south-eastward of Mangun kan, and marks the edge of the shoal which extends from the western side of the bay.

Keitei tō consists of two rocks, each 46 feet (14m0) high, lying near the outer edge of the bank which extends eastward from Mangun kan. In 1935 the *Kōryū maru*, with a draught of 17 feet (5m2), reported having touched bottom in a position about one mile eastward of the southern Keitei tō; a sounding of 2¾ fathoms (5m0) was obtained at low water. A reef, with a depth of 6 feet (1m8) over it, gravel, lies about 6 cables north-eastward of the southern Keitei tō. A black conical buoy is moored about 2 miles northward of Mangun kan, and marks the edge of the bank extending from the western shore of the bay.

Local knowledge is essential for entering Kaishū wan.

Kaishū kō.—Kaishū kō, situated on the northern side of the entrance to the inner bay at the head of Kaishū wan, is the port of Kaishū (Haijnube), a town situated about 2¼ miles northward of Ryūtō kaku (*Lat. 38° 00′ N., Long. 125° 42′ E.*). Tetsu tō is an islet, 121 feet (36m9) high, lying about 6 cables east-south-eastward of Ryūtō kaku and on the edge of the bank, which dries, extending eastward from that point. The harbour lies within the lines drawn 000° from Tetsu tō, and from Tetsu tō to the extremity of the Shintō promontory. On the southern side of Ryūtō kaku is a quay, about 500 feet (152m4) in length, where steam vessels not exceeding a draught of 12 feet (3m7) can lie alongside. There is a camber on the eastern side of the point, protected by a breakwater extending nearly one cable in a southerly direction; boats and small vessels can lie in the camber, but the whole of it dries.

It is stated that there is no good anchorage near Ryūtō kaku; from south-westward of Tetsu tō up harbour, the tidal streams are reported to attain a maximum rate of from 5 to 6 knots, and the winds are variable, so that even when moored great caution must be observed at night. There is fair anchorage southward of Tetsu tō, at single anchor with plenty of cable out, in depths of from 3¾ to 5 fathoms (6m9 to 9m1), but the bottom is rocky; the space is so restricted that vessels must anchor in mid-channel, where the tidal streams are very strong. It is reported that the harbour freezes up from January to March.

There is a storm signal station on Ryūtō kaku, where local storm signals, Class (1), are displayed: *see* page 38.

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Kaishū yū, the administration centre of the Ōkai province, had a population in 1935 of 30,447. Kaishū yū and Kaishū kō are connected to the Korean railway system and to the telegraph and telephone systems.

Trade and shipping.—The principal exports are rice, wheat, and beans; imports are fruit, textiles, cement, and artificial manures.

In 1934, 480 steam vessels totalling 117,294 tons, entered the port.

Coast.—Islet and shoals.—The coast between Dokujun kō (page 505) and Tōsan kan (Fankochi), a point about 14 miles west-south-westward, is indented by several bays, but they are all filled by flats which dry; Kyūgetsuho kō, a point 711 feet (216m7) high, situated about midway between Dukujun kō and Tōsan kan, is fairly conspicuous.

Mo tō, an islet 145 feet (44m2) high, with some houses on its north-eastern side and a clump of trees on its summit, lies about 2 miles south-westward of Dokujun kō, and there are shoals and foul ground between. A chain of islets and rocks extends fully half a mile southward from Mo tō, and shoals and banks extend as much as 3¼ miles offshore between this islet and Kyūgetsuho kō.

A 4-fathom (7m3) patch lies nearly 2½ miles southward of Kyūgetsuho kō, and a 4½-fathom (8m7) patch lies about 1½ miles south-westward of this point. Rocks and reefs extend for as much as one mile offshore in the bay between Kyūgetsuho kō and Tōsan kan; there is a conspicuous group of trees on the latter point. Enjaku shō, a rock 54 feet (16m5) high, lies about 7 cables east-north-eastward of Tōsan kan and about 2 cables offshore; it is white from sea-birds' droppings.

Junitō byōchi.—Tōsan kan is the southern extremity of Ō-kai dō, a peninsula which extends about 11 miles in a general south-westerly direction from the mainland. Hoki kan, the west point of the peninsula, is situated nearly 3 miles north-westward of Tōsan kan, and between these two points shoals and rocks extend for nearly one mile offshore in places. The approach to Junitō byōchi lies between Tōsan kan and Kari matsu (Bayly bluff), the south-western extremity of Jun-i (Suni) tō, situated about 6 miles westward. Junitō byōchi (Sunito anchorage) is in the channel, about 4 miles long and half a mile broad, between the western side of the peninsula northward of Hoki kan and the eastern side of the northern part of Jun-i tō; this channel is the southern part of Kōrei kō, an inlet which penetrates the land for about 13 miles in a north-easterly direction from its entrance between Hoki kan and the point on the south-east coast of Jun-i tō about one mile north-westward.

Jun-i tō is divided into two parts by a neck of land only about half a cable wide; each part is hilly, the south-western part being the higher. Kari matsu (*Lat. 37° 42′ N., Long. 125° 13′ E.*) is a precipitous headland, and has a conspicuous peak on it, 614 feet (187m1) high; Nanko sho, a group of rocks, extend about 8 cables westward from Kari matsu, and there are always tide-rips near it. The south-east coast is fringed with reefs, which extend as much as 4 cables from the south-western part of the island. A steep-to sandbank, with a least depth of 1½ fathoms (2m7) over it, extends about half a mile north-north-eastward from Yōtan rei, the north-east point of the island.

There are depths of from 7 to 15 fathoms (12m8 to 27m4) in Junitō byōchi, and the anchorage is sheltered from all but southerly and

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south-westerly winds; the depths on either side of the channel decrease rapidly. About one mile north-north-eastward of Hoki kan, and a quarter of a mile offshore, are some rocks with depths of less than 6 feet (1m8).

Dangers in the approach to Junitō byōchi.—Light-buoy.—Ō tō (Tokudoru) is a group of rocks about 5¼ miles south-westward of Tōsan kan, one of which is 11 feet (3m4) high, and the remainder dry. A rock, which dries 14 feet (4m3), lies nearly 1¼ miles southward of Ō tō and is the outermost danger in this vicinity.

Sanai tō, about 1¾ miles westward of Tōsan kan, is a small grassy sand cay; a reef, which dries, extends about 3 cables south-westward from it. There is foul ground, with some rocks which dry, within a distance of one mile south-westward and southward of Sanai tō. Reefs, with rocks above water and rocks which dry, lie within a distance of one mile south-westward of Tōsan kan, so this point must be given a wide berth; between these reefs and Sanai tō is a deep passage, except for a rock, which dries 6 feet (1m8), lying in mid-channel and about 7 cables south-eastward of Sanai tō.

Ōkei sentai is a large shoal lying about midway between Tōsan kan and Kari matsu; it has depths of less than 3 fathoms (5m5) over it, but its shoalest spots are almost awash.

Suiya sho is a rock awash lying fully 1¼ miles south-westward of Hoki kan and about three-quarters of a mile off the south-east coast of Jun-i tō; this rock is marked by a light-buoy, painted red and black in horizontal bands, exhibiting a *white flashing* light *every three seconds*.

Foul ground, terminating in a rock awash, named Sōki sho, extends about half a mile south-westward from Hoki kan.

Tidal streams.—The tidal streams between Sho-Enhei tō and Tōsan kan run eastward with the rising tide and westward with the falling tide, turning at about the times of high and low water. Westward of Tōsan kan the tidal streams follow the direction of the coast and run north-westward and south-eastward, the former running from about 3 hours after low water till about 3 hours after high water, and the latter from about 3 hours after high water till about 3 hours after low water.

Observations made during spring tides in a position 11 miles south-south-eastward of Kari matsu show that the direction of the tidal streams there alter 360° against the hands of a clock in 12 hours, the direction and rates being as follows:—At high water at Jun-i tō, N.N.W. 1·1 knots; 3 hours after high water, west 1·4 knots; at low water, S.S.E. 1·1 knots; 3 hours after low water, east 1·4 knots. Observations made at spring tides in a position 17 miles south-south-westward of the same point showed the same phenomenon, the direction and rates being as follows:—At high water, N.N.W. 0·8 knots; 3 hours after high water, W.S.W. 1·4 knots; at low water, S.S.E. 0·8 knot; 3 hours after low water, E.N.E. 1·4 knots.

Directions.—All the channels leading to Junitō byōchi require caution and local knowledge, as they are narrow and the tidal streams are strong and irregular. The channel eastward of Ōkei sentai can be entered between Sanai tō (*Lat. 37° 40′ N., Long. 125° 19′ E.*) and the patch of foul ground lying about three-quarters of a mile eastward, but the rock, which dries 6 feet (1m8), situated about 7 cables south-eastward of Sanai tō, must be avoided.

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Chart 1258.

The western channel, between Jun-i tō and Ōkei sentai, is the one generally used. From the eastward, vessels should pass southward of Ō tō, or between Ō tō and the foul ground which extends nearly one mile southward from Sanai tō, and then steer for the south-western extremity of Jun-i tō. When the hillock on Hoki kan bears 062°, course should be altered to keep it on this bearing, which leads about 1¼ cables south-eastward of the reefs extending from the south-western part of the south-east coast of Jun-i tō, and about the same distance south-eastward of Suiya sho. When Tōsan kan bears 132°, course should be altered to 034° so as to proceed in mid-channel to the anchorage.

Kōrei kō.—The depths in Kōrei kō for about 4 miles north-north-eastward of the northern extremity of Jun-i tō vary between 7 and 10 fathoms (12m8 and 18m3), and the width of the channel is not less than half a mile; care must be taken, however, to avoid the sandbank which extends about half a mile north-north-eastward from Yōtan rei (page 507).

Ryūko (Yong er) tō is the collective name of the chain of islands, lying on a bank which dries, extending about 3¼ miles north-eastward from a position about three-quarters of a mile north-westward of Yōtan rei. Ryūkotō ri is situated on the eastern side of the southernmost of these islands, and there is good anchorage, in depths of from 6 to 8 fathoms (11m0 to 14m6), sand and mud, off this village; Eitoku sho, a reef which partly dries, lies in mid-channel between the northern extremity of Jun-i tō and this island. Local storm signals, class (1), are displayed at Ryūkotō ri; *see* page 38. Moha ri, a village on the northern end of the largest island, is connected to Sakan ri, on the mainland north-westward, by a submarine telegraph cable. Fishing stakes are to be found around Ryūko tō from September to May.

Coast.—The peninsula which forms the north-western side of Kōrei kō is much indented and is fringed by mud flats which dry. Between the western extremity of this peninsula and a point about 4 miles north-westward is the entrance to a large bay which mostly dries. The north-western entrance point of this bay is the eastern entrance point of an inlet named So kō, which penetrates the land in a northerly direction and has a wooded island in it; the village of Ōshin (Onjin) is situated on the eastern side of this inlet. There is a narrow channel between the banks extending from this part of the coast and those on which Gyoka tō and Shorin tō (*see* below) are situated; this channel leads close past the entrance to So kō and is used by local sailing craft plying between Kōrei kō and Chinnanpo.

The coast between the western entrance point of So kō and the southern entrance point of Daito wan, situated nearly 9 miles north-westward, is fringed by reefs in places.

Off-lying islands and dangers.—Islands and banks north-westward of Jun-i tō.—Gyoka (Erha) tō lies with its southern extremity about 2½ miles north-north-eastward of Kari matsu and about half a mile off the north-west coast of Jun-i tō; mud and sand banks extend about 3 miles north-eastward from this island, and form the north-western side of a deep channel which leads to the anchorage off Ryūkotō ri. The south-western entrance to this channel lies between the foul ground extending westward from Kari matsu and a shoal, with a least depth of one foot (0m3) over it, lying about 7 cables north-westward of Kari matsu. Kō gan, a rock with a depth of 2 fathoms

Charts 1256, 1262.

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Chart 1258.

(3m7) over it, lies about half a mile north-eastward of the northern extremity of the south-eastern end of Gyoka tō and nearly in mid-channel. In the north-eastern entrance of the channel is Eitoku sho (page 509).

Shōrin (Chanrin) tō lies about 3 miles north-westward of Gyoka tō, and is almost connected to it by a sandbank with depths of less than 3 fathoms (5m5); another sandbank extends northward from the northern side of Shōrin tō, and a narrow neck of it connects with the mainland about 2 miles westward of the western entrance point of So kō. A reef, which dries, extends about 1¼ miles from the west point of the island, and on this reef are three islets, the outermost having a flat top 98 feet (29m9) high; there are always tide-rips outside this islet. Kaigan tō (*Lat. 37° 50′ N., Long. 125° 12′ E.*), an islet 94 feet (28m7) high, is connected to the north point of Shōrin tō by a sand spit which dries.

Off-lying islands and dangers.—Hiyō tō (Piyobu somu), about 5¾ miles south-south-westward of the south point of Shōrin tō, is a serrated, rocky islet, conspicuous from the eastward. Rocks and shoals lie within a distance of about one mile south-eastward and eastward of this islet, and a shoal extends about 3 cables northward from it. A rock, with a depth of 1¼ fathoms (2m7) over it, lies nearly 2½ miles eastward of Hiyō tō, and about 3 cables westward of this rock is a rock with a depth of 1¾ fathoms (3m2); these rocks are plainly marked by eddies when the tidal streams are at their strength. Vessels should not attempt to pass between the rocks and Hiyō tō.

Kirin shu, a bank with depths of from 3 feet (0m9) to 3 fathoms (5m5) over it, extends nearly 6 miles north-westward from a position about one mile northward of Hiyō tō; vessels should not attempt to pass between the south-eastern end of this bank and Hiyō tō.

Kirin tō, about 7¼ miles north-north-westward of Hiyō tō, consists of two hilly parts connected by a neck of low land; it is separated from the mainland by a deep channel fully 2 miles wide. Shoals and rocks extend as much as 6 cables from the eastern side of Kirin tō; a bay on the north-western side is entirely occupied by a bank which dries, and there are depths of less than 3 fathoms (5m5) for a further mile outside this bank. A detached shoal, with a least depth of 1¼ fathoms (2m3), lies about one mile northward of the island.

Karin tō consists of three rocks, the highest being 108 feet (32m9) high, situated on a reef which extends nearly 1¼ miles west-south-westward from a position about 1¼ miles westward of the west point of Kirin tō; there are other rocks, above water and awash, on this reef. There are always heavy tide rips in the passage between this reef and Kirin tō, and it should not be used.

Tidal streams.—The tidal streams from off Jun-i tō to the entrance of Daitō wan run between west and north-west, and between east and south-east; the maximum rate is about 3½ knots. The stream which comes from the eastward divides into two parts at Hiyō tō; the inshore stream flows past the outer end of Shōrin tō, passes either side of Kirin tō, and thence along the eastern side of Naka su (page 512); the offshore stream flows westward of Kirin shu and then divides into two branches, one flowing between Karin tō and Naka su, and the other passing westward of Naka su.

Daisei guntō.—Light.—Daisei guntō (Techong group) consists of

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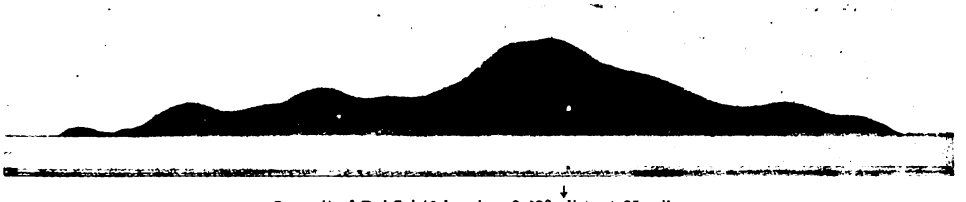
Chart 1258.

three islands, the southernmost of which, named Shō-Sei (Soi chong) tō, lies about 11 miles westward of Kirin tō; these islands are sparsely populated, but they are frequented each year by fishing vessels from Chefoo and the northern part of the east coast of China.

The south-east point of Shō-Sei tō consists of white cliffs, and a rock, 60 feet (18m3) high, lies about 2 cables eastward of it. A rock, 4 feet (1m2) high, lies about 3 cables east-north-eastward of the north-east point, and two rocks above water lie within half a mile southward of the south-west point of the island. Shō-Sei tō is stated to afford the only shelter in this neighbourhood during the northerly gales of winter. Shō-Sei su, with a least depth of 3 fathoms (5m5) over it, lies about 2 miles east-south-eastward of the south-east point of Shō-Sei tō and on the northern end of a bank, with depths of less than 10 fathoms (18m3), which extends about 3½ miles southward from this shoal.

A light is exhibited, at an elevation of 267 feet (81m4), from a white circular concrete tower, 33 feet (10m1) in height, situated on the south-western extremity of Shō-Sei tō; a W/T fog signal is transmitted from the lighthouse (*Lat. 37° 45′ N., Long. 124° 44′ E.*).

Dai-Sei (Te chong) tō is situated nearly 2½ miles north-westward of Shō-Sei tō, and its summit, situated in the southern part of the island, appears conical when seen from the westward. The coasts are mostly cliffy; the middle part of the south coast is precipitous, but the north-east coast is a white sandy beach. Two rocks, which dry 4 feet (1m2), lie about 6 cables northward of the island. A shoal, with depths of less than 3 fathoms (5m5) and one portion which dries, extends fully 3 miles north-westward from the north-western side of Dai-Sei tō. Kōchiku (Barren islet), a rock 148 feet (45m1) high and precipitous on its western side, lies about one mile westward of the southern extremity of Dai-Sei tō; Shō-Kōchiku, 17 feet (5m2) high, lies about a quarter of a mile northward of Kōchiku. Senshin ho, a small bay with a shingle beach on the eastern side of Dai-Sei tō, affords anchorage, in depths of from 5¾ to 9 fathoms (10m5 to 16m5), sand, with the eastern extremity of Hakurei tō in line with the north-east point of Dai-Sei tō, bearing about 006°; this anchorage is sheltered from winds between south-west and north, and also from heavy seas from the southward by Shō-Sei tō. There are two vilages on the shore of the bay.



Summit of Dai-Sei tō bearing 0 23°, distant 25 miles.

Summit of Dai-Sei tō bearing 091°, distant 13 miles.

Charts 1256, 1262.

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Chart 1258.

Hakurei (Peng yong) tō lies with its southern extremity about 4 miles northward of Dai-Sei tō, and is the northernmost and largest of the group. Its summit, situated in the middle of the northern part of the island, has a flat top 605 feet (184m4) high, and is easily identified from the south-eastward. The north-western part of the island is thickly wooded, with cliffs about 500 feet (152m4) high along the coast; Sendai gan (Finger rock), 185 feet (56m4) high, is situated close off the north-west point, and Chinese junks frequently shelter, from all except northerly winds, in the small cove immediately eastward of this point. Vessels should give the north coast a wide berth, as a reef, with a least depth of 4½ fathoms (8m2), lies about one mile offshore, and there are several rocks within a distance of about 2 cables from the coast. Ren hō (Middle rock) consists of two conspicuous rocks lying close together and about 1½ miles southward of the south point of Hakurei tō; the southern rock is 65 feet (19m8) high and peaked, whilst the northern has a rounded summit 40 feet (12m2) high. Sunken rocks and rocks which dry lie within one mile northward and southward of Ren hō. A shoal, with depths of from 1¾ to 5 fathoms (3m2 to 9m1), extends about 2½ miles west-north-westward from Ren hō. The east coast of Hakurei tō is indented by a bay which dries entirely. Kengai kaku (East Bluff), the east point of the island, rises precipitously to an isolated hill. Hakurei su is a narrow sandbank, with depths of from 1½ to 3 fathoms (2m7 to 5m5), which extends about 5½ miles south-south-eastward from a position about 1½ miles southward of Kengai kaku.

Tidal streams.—The tidal streams near Daisei guntō in general flow northward or southward, the maximum rate being from 3 to 4½ knots; the north-going stream runs from about 2½ to 3 hours after low water till from 2½ to 3 hours after high water, and the south-going stream from about 2½ to 3 hours after high water till from 2½ to 3 hours after low water. In the channel between Shō-Sei tō and Dai-Sei tō the tidal streams run north-eastward and south-westward; in the channel between Dai-Sei tō and Hakurei tō they run north-westward and south-eastward.

In thick weather it is important to remember that the rate of the tidal streams is strongly influenced by the direction and strength of the wind on the previous day.

Islet and banks between Hakurei tō and the mainland.—Getsudai tō (Gets nai tau) lies about 6 miles north-eastward of the north-east point of Hakurei tō and about 2½ miles offshore; foul ground extends about half a mile from its northern side.

Naka su, a bank with depths of less than 10 fathoms (18m3), extends nearly 14 miles south-south-eastward from a position about one mile westward of Getsudai tō. The shoalest part of this bank is near the southern end, where there is a depth of 1¼ fathoms (2m3); nearly 3 miles southward of Getsudai tō (*Lat. 38° 03′ N., Long. 124° 49′ E.*) there is a 2¾-fathom (5m0) patch, and between these two shoal parts there are depths of not less than 5¾ fathoms (10m5) on the bank. Under ordinary conditions Naka su is not easily discerned, as the water is uniformly discoloured, but when a sea gets up it can easily be located on account of the breakers.

Jūnishi su (Ni ki se) is a continuation of Naka su, and extends about 7½ miles in a west-north-westerly direction from the position

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Chart 1258.

about one mile westward of Getsudai tō; the depths over it vary from 1¾ to 6 fathoms (3m2 to 11m0). There is a deep channel, not less than three-quarters of a mile wide, between Jūnishi su and the coast northward.

Ban su (Iwa se) is a bank, with depths of less than 5 fathoms (9m1) over it, which extends nearly 2 miles east-south-eastward from a position about 6 cables eastward of Getsudai tō; the least depth on this bank, near the eastern end, is 1¾ fathoms (3m2). In 1932, Ban su was reported to be extending west-north-westward.

Daitō wan.—Dangers.—Makō tō (Tomahabu) is situated about 9½ miles south-eastward of Getsudai tō and there is only a narrow boat passage between it and the coast eastward; there are two peaks in the southern part of this islet, one being covered with pine trees and the other bare. Daitō wan is entered between Makō tō and Riku (Sonjon) tō, a flat-topped islet about 8½ miles northward, joined to the mainland by a sandbank which dries. At the head of the bay are flat cultivated plains.

There are several dangers in the entrance to Daitō wan. Shoals, with a least depth of 2½ fathoms (4m6), lie within a distance of 2¾ miles northward of Makō tō. Sodoru shō, a rock 4 feet (1m2) high, lies about 2½ miles north-westward of Makō tō, and a rock, which dries 8 feet (2m4), lies about one cable eastward of Sodoru shō. Daitō shu is a sandbank, with depths of from 3 to 4 fathoms (5m5 to 7m3) over it, which extends about 1¼ miles northward from a position about 3 miles northward of Sodoru shō. A shoal, with a least depth of 4½ fathoms (7m8) over it, lies about midway between Makō tō and Riku tō, and a 4½-fathom (7m8) patch lies about 2½ miles southward of the latter.

Kumisen sho (Kurnijon yo), a reef which dries 5 feet (1m5), lies about 1¾ miles south-south-eastward of a promontory, with a hill 60 feet (18m3) high on it, situated nearly 3½ miles eastward of Riku tō. In 1927 a rock, with an estimated depth of 1½ fathoms (2m1) over it, was reported to lie about 1½ miles south-eastward of the same promontory.

Kumi ho is a small bay on the eastern side of the 60-foot (18m3) high promontory just mentioned; it is well sheltered and affords good anchorage for small vessels.

Anchorages.—Directions.—Good anchorage, in depths of from 4 to 5½ fathoms (7m3 to 10m1), sand and mud, can be obtained off Kumisen sho. Eastward of this reef the bay shoals to 3 fathoms (5m5) and less.

There is anchorage, in depths of from 3 to 4 fathoms (5m5 to 7m3), good holding ground, off the entrance to Kumi ho; there is sufficient space for four or five vessels of 2,000 tons, but facilities for handling cargo are very limited, it only being possible to unload one vessel at a time by lighters. A red buoy, privately maintained, is moored about 6 cables east-south-eastward of the 60-foot (18m3) summit on the promontory on the western side of Kumi ho, and vessels not exceeding a draught of about 18 feet (5m5) should anchor westward of this buoy and as near the shore as their draught permits; a good position is about 6 cables south-south-eastward of the 60-foot (18m3) summit, in a depth of about 3 fathoms (5m5), mud. The tidal streams set eastward with the rising tide and westward with the falling tide,

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Chart 1258.

but they are not strong. Kumi ho is a summer resort for Europeans, and their coloured houses on the promontory make it easy to identify the place.

Vessels bound for the anchorage in Kumi ho from the southward should steer a mid-channel course through the channel which is bounded westward by Sho-Sei su and Hakurei su, and eastward by Kinin su and Naka su. When the summit of Makō tō (*Lat. 37° 55′ N., Long. 124° 58′ E.*) bears 070° course should be altered to pass about half a mile north-westward of Sodoru shō, thence steering about 034° for the anchorage. At night or in thick weather, if the land cannot be made out, vessels are advised to make for Chosan kan, a headland nearly 9 miles northward of Hakurei tō, passing outside Daisei guntō, and then proceed as directed hereafter for vessels from the northward.

Vessels from the northward or westward should pass between Jūnishi su and the mainland northward, holding the latter side of the channel; thence pass about half a mile southward of Riku tō, and steer an easterly course for the anchorage.

Chart 1257.

Coast.—Chosan kan (Choppeki point) is the most prominent headland on the west coast of Korea, and there is a rock 135 feet (41^{m}1) high, named Daikan gan (Dai gan do), close off it; about one cable westward of this rock is a rock awash. Taisan hō, about 5¼ miles eastward of Chosan kan, is 1,257 feet (383^{m}1) high and is the highest peak in this vicinity. The tidal streams off Chosan kan run northward with the rising tide and southward with the falling tide, the maximum rate being from 5 to 7 knots.

Taisan hō, bearing 107°, 35m.

Chosan kan.

Between Chosan kan and Goryūchi saki (Go rin chi ki), about 16 miles north-eastward, is a bight with sandy beaches; between these beaches and the hilly ranges a few miles inland is a belt of cultivated land, with scattered villages. The land within Goryūchi saki rises steeply to Kōseki san (Mount Toa pai), a peak 1,300 feet (396^{m}2) high, situated about 1¾ miles eastward of the point. Mukin ho, an inlet which dries except for a narrow channel, is entered about 7 miles north-eastward of Chosan kan. There are several islets off its entrance; one of these is Dai tō, which lies about 3 cables offshore and is covered with grass; Seki tō, consisting of some rocks from 20 to 30 feet (6^{m}1 to 9^{m}1) high, lies close off the western end of Dai tō. Mukin ho is much frequented by junks; there is a regular launch service with Chinnanpo. Local storm signals, class (1), are exhibited at Mukin ri, a village on the southern side of this inlet; *see* page 38; Kogan ho, an inlet which penetrates the land in a south-easterly

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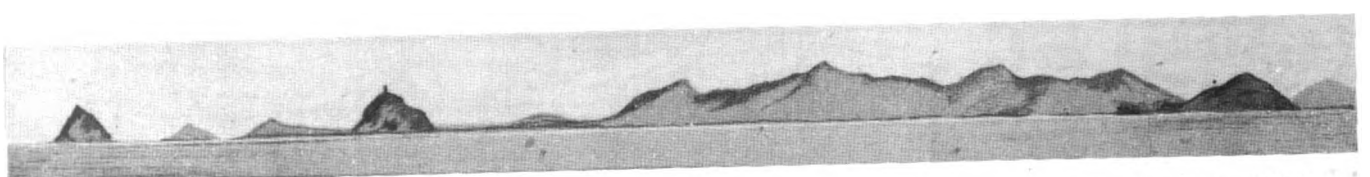
To face page 513.



Tokii tō. Sei tō lighthouse, bearing 081°, distant 5¼ miles. Shō tō. S.W. extremity of Shō tō.

Approach to Daidō kō.

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Chart 1257.

direction, is entered about 6 miles north-eastward of Dai tō, and is available for small vessels only; Daisō gan, a bank which dries, extends about one mile northward from its southern entrance point.

The coast for about 4 miles north-eastward of Goryūchi saki is hilly, but thence to Reisei saki, a further 9 miles north-eastward, it is low and cultivated. Between Reisei saki and Biwa kan, situated about 3½ miles northward, the hills approach the coast again.

Off-lying banks.—Chōsan kan dashi (Choppeki dashi) is a narrow bank, with depths of from 1½ to 5¾ fathoms (2m7 to 10m5) over it, which extends about 13 miles northward from a position about 5½ miles north-north-eastward of Chōsan kan.

Hanare su, with depths of from 1½ to 5 fathoms (2m3 to 9m1), extends about 6 miles northward from a position nearly 6 miles north-westward of Goryūchi saki and close to the northern end of Chōsan kan dashi.

Chart 1656.

APPROACH TO DAIDŌ KŌ.—Shō tō.—Light.—Shō tō (Cho da) lies south-westward of the mouth of the Daidō kō and with its eastern extremity about 6 miles south-westward of Biwa kan. A shoal, with depths of less than 3 fathoms (5m5), extends as much as 2 miles from the southern side of the island, and a ridge, with depths of from 2 to 3 fathoms (3m7 to 5m5), extends about 2¾ miles south-westward from a position nearly half a mile southward of the eastern end of the island.

Toku (Hoku) tō lies about half a mile north-westward of the north point of Shō tō. Sei tō lies nearly 2½ miles south-westward of Toku tō and about 8 cables north-westward of Washi-ga (Sagigi) hana, a point on the west coast of Shō tō. *See* view facing this page.

A light is exhibited, at an elevation of 302 feet (92m0), from a white circular concrete tower, 22 feet (6m7) in height, situated on the summit of Sei tō (*Lat. 38° 33′ N., Long. 125° 46′ E.*). A fog signal is sounded from the lighthouse.

Shō tō suidō.—Dangers.—Shō tō (Chotō) suidō, between Shō tō and the mainland, can be used by vessels from the southward proceeding to the Daidō kō. On the eastern side of the channel and about 3¾ miles south-eastward of the eastern extremity of Shō tō, is a point 41 feet (12m5) high; an islet, 37 feet (11m3) high, lies about 4 cables northward of this point, and within a distance of 6 cables northward of this islet are some rocks which dry. Between this islet and Reisei saki is the entrance to a shallow bay. A rocky ledge, with some small islets on it, extends about half a mile westward from Reisei saki, and there are several sunken rocks and rocks which dry within a distance of one mile westward and 1½ miles north-westward of this cape; a shoal, with a least depth of 2 fathoms (3m7) over it, lies about 1½ miles south-westward of Reisei saki. Biwa kan, on the eastern side of the northern entrance to Shō tō suidō, is a headland 155 feet (47m2) high; Koku gan, a rock 14 feet (4m3) high, lies about 2 cables north-westward of it. A rocky shoal, with a least depth of 3½ fathoms (6m4) over it, lies with its western extremity nearly one mile south-westward of Biwa kan, and overfalls occur near it. Ko tō is an islet lying about half a mile north-eastward of Biwa kan, and a shoal, with

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Chart 1656.

depths of less than 3 fathoms (5^{m}5), extends about half a mile westward from its southern extremity; So gan, a rock 2 feet (0^{m}6) high, lies about 2 cables off the north point of Ko tō.

The western side of Shō tō suidō is bounded by Uchi su or Nai shū, which extends fully 3½ miles northward from a position about one mile north-eastward of the eastern extremity of Shō tō; the southern end of this shoal dries. Shōmon gan, a white rock 6 feet (1^{m}8) high, lies about midway between the eastern extremity of Shō tō and the southern end of Uchi su; a rock, which dries 12 feet (3^{m}7), with another rock which dries close south-westward of it, lies nearly 4 cables north-eastward of Shōmon gan, and there are overfalls near them.

Banjō shō is a rock, with a depth of 4 feet (1^{m}2) over it, lying in mid-channel and about 2 miles westward of Reisei saki. Sekihoku kaku, the northern extremity of Seki tō (*see* below) in line with Koku gan, bearing 017°, leads nearly half a mile westward of Banjō shō. The fairway between Banjō shō and Uchi su is fully one mile broad, with depths of over 6 fathoms (11^{m}0). A 5½-fathom (9^{m}6) patch lies about 2 miles northward of Banjō shō.

Shoals northward of Shō tō.—Buoys.—Higashi no su, with depths of less than 5 fathoms (9^{m}1) over it, extends about 27 miles north-north-eastward from a position about 4½ miles northward of Sei tō; in places there are depths of less than 6 feet (1^{m}8) on this bank. In 1933 it was reported that the depths on this bank, in a position from 11 to 12 miles north-north-eastward of Sei tō, had decreased considerably. In the same year the *Kankyō maru* reported a depth of 12 fathoms (21^{m}9) about 7 miles north-north-westward of Sei tō.

Shimo su or Ka shū, with depths of from one foot (0^{m}3) to 3 fathoms (5^{m}5) over it, extends nearly 5 miles north-eastward from a position about half a mile northward of the northern extremity of Shō tō, and forms the southern side of the main channel leading to the entrance of the Daidō kō. A light-buoy, painted red and white in horizontal bands, and exhibiting a *white flashing* light *every three seconds*, is moored off the north-eastern end of Shimo su.

Naka su or Chū shū, on the northern side of the main channel, has depth of from 3 feet (0^{m}9) to 3 fathoms (5^{m}5) over it, and extend about 5 miles north-eastward from a position about 4½ miles north-eastward of the northern extremity of Shō tō. The channel between the northern end of Shimo su and the southern end of Naka su is about one mile wide. A conical buoy, painted black and white in horizontal bands, surmounted by a diamond, is moored off the south-western end of Naka su and is known as Naka su buoy.

A light-buoy, painted black, and exhibiting a *white group flashing* light, giving *two flashes every nine seconds*, is moored off the south-western extremity of the spit which extends about 4 miles south-westward from Toku tō, a conspicuous islet, covered with grass and 284 feet (86^{m}6) high, situated nearly 9½ miles northward of Biwa kan; this buoy is known as Naka su North light-buoy.

Seki tō.—Off-lying islets and shoals.—Light.—Seki tō lies with Nan kaku (*Lat. 38° 37′ N., Long. 124° 59′ E.*), its southern extremity, about 2 miles north-north-eastward of Biwa kan and on the southern side of the main entrance channel of the Daidō kō; this island is joined to the mainland eastward by a bank, with depths of less than 3 fathoms (5^{m}5), which forms the southern side of the main channel.

Charts 1257, 1256, 1262.

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Chart 1656.

Shimai tō consists of two islets, connected by a rocky ledge, lying about a quarter of a mile westward of Sekihoku kaku, the north point of Seki tō. Tobi su or Hi shū, a shoal with depths of from 2 to 5 fathoms (3m7 to 9m1), extends about 2¾ miles south-south-westward from a position about a quarter of a mile south-westward of Shimai tō.

A light is exhibited, at an elevation of 129 feet (39m3), from a white circular concrete tower, 25 feet (7m6) in height, situated on the western islet of Shimai tō. A fog bell is sounded from the lighthouse.

Anchorages.—Sekitō byōchi, the anchorage off the south-eastern side of Seki tō, is in depths of from 4½ to 6 fathoms (8m2 to 11m0), sand and shells, with Nan kaku bearing 270°, and the eastern extremity of Seki tō bearing 008°; the bottom is rocky in places.

There is also anchorage, in depths of from 5 to 11 fathoms (9m1 to 10m9), sand and mud, about 4 cables northward of Seiyō tō, an island situated about 3¼ miles south-eastward of Nan kaku, with Toku tō bearing 260° and seen between Biwa kan and Ko tō; ore from a mine situated about 4½ miles eastward of this anchorage is shipped here.

Both these anchorages are reached by passing through the deep channel between Nan kaku and So gan; for directions *see* page 522.

Tidal streams.—Near Shō tō and Seki tō the tidal stream with the rising tide runs northward or north-eastward from low water to one hour after until high water to one hour after; with the falling tide the tidal stream runs southward or south-westward from high water to one hour after until low water to one hour after. The maximum rates off Shō tō are 2½ knots with the north-going stream, and 3 knots with the south-going stream; off Seki tō, 2½ knots and 3¼ knots, respectively.

DAIDŌ KŌ.—The Daidō kō (Taidong kang) has its source in Shōhaku san, a mountain 7,156 feet (2181m1) high, situated in the middle of the northern part of Korea, and flows for about 237 miles in a general south-south-westerly direction into the Yellow sea northward of Seki tō; nearly 30 miles eastward of Seki tō the Sainei kō joins if from the southward, and the direction changes abruptly to a westerly direction, the latter part being also known under the name of Pingyang inlet. The Daidō kō is more discoloured than any other river in Korea, and, with the ebb stream, the dirty water is carried far out to sea.

Chinnanpo, an open port, is situated on the northern side of the river and about 20 miles above Seki tō, and can be reached by large vessels at all states of the tide; thence to Tetsu tō, at the junction of the Sainei kō and Daidō kō, the fairway is deep and free from dangers. Vessels of 5,000 tons can reach Kenjiho, situated on the eastern bank of the Daidō kō about 17 miles above Chinnanpo, and vessels of 3,000 tons can reach Hosan, situated on the western bank about 29 miles above Chinnanpo.

The buoys in the Daidō kō and its approaches are removed during the season of drift ice.

Ice.—The Daidō kō usually freezes over from late December till the middle of March, and it is then impassable above Chinnanpo; owing to the drift ice Chinnanpo is liable to be cut off from the sea for as much as three weeks during this season. From about 22nd January to 15th February the drift ice forms a dense pack off Shimai tō, com-

Charts 1257, 1256, 1262.

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Chart 1656.

pletely blocking the channel, although in recent years an increasing number of vessels have forced their way through. Drift ice appears at Chinnanpo not more than 10 days after the upper reaches of the river and its tributaries are frozen over; water vapour rising from the whole surface of the river is an immediate warning of its approach.

With drift ice the worst part of the channel is that in the mouth, between Shimai tō and Hi tō, situated nearly 10 miles eastward, and the conditions then determine whether entry into the river is possible or not; once past Hi tō (*Lat. 38° 41′ N., Long. 125° 11′ E.*) the vessel has overcome the greatest part of her difficulties. Less drift ice may be expected during neap tides than during spring tides, as the latter bring it off the banks. If a vessel coming in with the rising tide gets shut in the ice in mid-channel she has nothing to fear, as the stream will carry her up the fairway; the best time to pass through Hitō suidō is one hour before high water. It is important to note the colour of the ice: green or white ice is easily broken and is not dangerous, but brown or grey ice has been formed on the banks, which dry, along the coast, and is full of mud and sand, not easily broken and dangerous.

Reports on the ice conditions are issued by the Shimai tō W/T station (*see* Admiralty List of Wireless Signals), but the continually changing effects of the tidal streams and the wind must not be overlooked.

Tidal streams.—The tidal phenomena in the river vary considerably with the season, the wind and the rainfall, but present certain regular features. In mid-stream both the flood and the ebb streams follow the course of the river; except in Tetsutō suidō, the maximum rate at spring tides is between 4 and 4¾ knots for the ebb stream, and between 2½ and 3½ knots for the flood stream. The flood stream runs for a shorter period than the ebb stream. The interval from low water to the turn of the stream is longer than that from high water to the turn; in general the streams turn from 0 to 1½ hours after high and low water, there being no period of slack water. The streams are stronger in the lower reaches than in the upper reaches.

Shimai tō to Hitō suidō.—Lights.—Buoy and beacons.—The main channel of the river eastward of Shimai tō (page 517) is bounded southward by the bank, with depths of less than 3 fathoms (5^{m}5), which extends eastward from Seki tō to the mainland, and northward by some banks and shoals which extend in a crescent shape from a position about three-quarters of a mile north-eastward of Shimai tō as far as Hi tō. Jō-Suira tō is situated about 6½ miles east-north-eastward of Shimai tō and on the eastern end of the largest of the banks on the northern side of the channel; Ka-Suira tō lies about three-quarters of a mile north-westward of Jō-Suira tō. Shoals extend about 6 miles westward of Ka-Suira tō, and there is another channel northward of them; this channel subsequently leads northward of Chiri tō and Hi tō, and, though wider than the main channel, it has several shoals in it, and is only used by vessels of light draught.

Seki tō North buoy is a black conical buoy, surmounted by a cylinder, moored about three-quarters of a mile north-eastward of Shimai tō; it marks the western extremity of the banks on the northern side of the main channel.

Charts 1257, 1256, 1262.

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Chart 1656.

San tō, on the southern side of the channel, is situated about 2 miles southward of Jō-Suira tō and about half a mile north-westward of Gan kaku; it is surrounded by a reef, and a detached rock, which dries 7 feet (2m1), lies about 1½ cables northward of it. The bay between Gan kaku and Koisu kaku, about 2½ miles eastward, is almost entirely occupied by a mud flat which dries.

A light is exhibited, at an elevation of 122 feet (37m5), from a white circular concrete tower, 12 feet (3m7) in height, situated on San tō.

Chiri tō, about 1½ miles north-eastward of San tō, is a rock 31 feet (9m4) high, and is a good mark; a shoal, with some rocks which dry on it, extends about 4 cables southward of Chiri tō. Two reefs, with depths of 2¾ and 2 fathoms (5m0 and 3m7), lie about a quarter of a mile north-westward and half a mile northward, respectively, of Chiri tō. A 4-fathom (7m3) patch lies about three-quarters of a mile north-eastward of San tō and nearly in mid-channel. The depths in this locality are very irregular, and caution is necessary.

A light is exhibited, at an elevation of 56 feet (17m1), from a white octagonal concrete structure, 26 feet (7m9) in height, situated on Chiri tō.

Chart 1656, plan of Hitō suidō.

Hi tō (*Lat. 38° 41′ N., Long. 125° 11′ E.*), about 2¾ miles eastward of San tō, is the middle and largest of three islets situated on the northern side of the main channel; Gyoku tō is the eastern islet, and a rock, 20 feet (6m1) high, lies about one cable southward of it; Kochō tō, the western islet, is connected to Hi tō by a sandbank which dries. A shoal, with depths of less than 3 fathoms (5m5), extends about 1½ miles north-westward from Hi tō; a sandbank which dries 6 feet (1m8) and a rock 3 feet (0m9) high lie on the northern side of this shoal.

A light is exhibited, at an elevation of 198 feet (61m0), from a white circular concrete tower, 12 feet (3m7) in height, situated on the summit of Hi tō.

Hitō suidō, the channel between Hi tō and Koisu kaku, a point on the mainland southward of Hi tō, is only about a quarter of a mile wide between the shoals extending from either side, but the fairway is deep. Two leading beacons, erected on the summit of a hill about 3 miles east-south-eastward of Koisu kaku, in line bearing 109°, lead through Hitō suidō. The front beacon, elevated 226 feet (68m9), is a white wooden pillar surmounted by a triangle, 30 feet (9m1) in height; the rear beacon, elevated 228 feet (69m5), is a white wooden pillar surmounted by a sphere, 24 feet (7m3) in height, and is situated about half a cable east-south-eastward of the front beacon. In the middle of Hitō suidō the east-going stream changes to the west-going stream about 15 minutes after high water, and the west-going stream changes to the east-going stream about 50 minutes after low water and runs for about 7 hours; the maximum rate of the east-going stream is 3½ knots, and that of the west-going stream is 4½ knots.

Chart 1656.

Hitō suidō to Chinnanpo.—Light.—Buoys and beacon.—The channel of the river between Hitō suidō and Chinnanpo is practically free from dangers; its width is reduced to about one mile in places where various headlands project on either side. The bays between these headlands are all occupied by mud flats which dry, and there are fishing stakes on the edges of these flats during the season; there are several islets on these flats.

Charts 1257, 1256, 1262.

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Chart 1656.

Kōryō wan, on the northern side of the river opposite Hi tō, is a narrow bay which dries, except for a narrow channel only suitable for boats; there are extensive salt works on the eastern side of the bay. The channel into Kōryō wan is marked by two red buoys and two black buoys; a beacon, painted black and white in horizontal bands, surmounted by a triangle, stands at the head of the bay. A shoal, with depths of from 1¾ to 3 fathoms (3m2 to 5m5) over it, lies about midway between Hi tō and the entrance of the channel leading to Kōryō wan.

Gori ho light is exhibited, at an elevation of 105 feet (32m0), from a white square concrete tower, 20 feet (6m1) in height, situated on a point on the southern shore about 2¼ miles south-eastward of Hi tō.

Cho tō, an island on the mudbank extending from the southern side of the river, lies with Chotō kaku, its cliffy north-western extremity, about 7 miles eastward of Gori ho lighthouse. A rock, with a depth of 6 feet (1m8) over it, lies about a quarter of a mile westward of Chotō kaku, and about a quarter of a mile further westward is a rock with a depth of 4¼ fathoms (8m2).

Gagyū tō is situated on the northern side of the river, nearly 1¼ miles north-westward of Chotō kaku; there are salt pans between it and the coast northward. A 4¾-fathom (8m7) patch lies about half a mile south-eastward of Gagyū tō; there is a deep depression in the bed of the river between this patch and the rock, with a depth of 4¼ fathoms (8m2), lying about half a mile westward of Chotō kaku.

Chart 1656, plan of Chinnampo kō.

Shi-enshin tō (*Lat. 38° 43′ N., Long. 125° 21′ E.*), an islet about 3 cables east-north-eastward of Gagyū tō, has a single tree on its southern extremity, which is a good mark.

Chinnanpo kō.—Amongst the harbours in Korea, Chinnanpo kō has developed to such an extent in latter years that it ranks next to Fusan and Chemulpho. The river here is nearly one mile broad, with depths of from 7 to 15 fathoms (12m8 to 27m4), generally sand and mud, and there is sufficient space to accommodate several large vessels at the same time. The anchorage is well sheltered on all sides, and its only disadvantage is that it is occasionally closed by drift ice in winter. The western limit of the harbour is a line drawn 000° from the summit of Cho tō to a beacon on the northern side of the river; the eastern limit is a line drawn 349° from a beacon on Bōtatsuri saki, situated about 3¼ miles east-north-eastward of the summit of Cho tō, to a beacon on the north-eastern extremity of Ka tō. In 1936 it was reported that these beacons did not exist.

Manryoki saki is situated about one mile eastward of Shi-enshin tō and just within the western limit of the harbour; there is a flagstaff on the point, with a quarantine station close northward of it. Between Shi-enshin tō and Manryoki saki is the entrance to a bay which dries, except for a narrow creek running through the middle; at the head of this creek is a long bridge.

Nanho saki (Nampo ki) is situated about half a mile eastward of Manryoki saki, and there is a tide observation station, painted white, on its extremity; a conspicuous white building is situated nearly one cable north-westward of Nanho saki. Endai (Yendai) san is a round-topped hill about 3 cables northward of Nanho saki.

Charts 1257, 1256, 1262.

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Chart 1656, plan of Chinnampo kō.

Two wireless masts, situated on a hill nearly half a mile north-eastward of Nanho saki, are conspicuous. There is a conspicuous tall chimney on Ka tō, and also two lower chimneys.

Bōtatsuri saki is the most prominent headland on the southern shore of the river, and is easily identified; it has a somewhat flat summit, 95 feet (29^{m}0) high.

A basin has been constructed on the western side of Hihatsu tō, situated about one mile east-north-eastward of Nanho saki; dredging is continually in progress, and the greater part of the basin and alongside the quays has been dredged to a depth of 20 feet (6^{m}1). Two vessels of 3,000 tons can lie alongside the quay on the eastern side of the basin, and two alongside the southern part of the quay on the western side; the northern part is used for small craft and lighters, the depth alongside being 5 feet (1^{m}5). The wharves are connected to the railway system. The Custom house is at the head of the basin.

The banks of Goho sen, a creek on the eastern side of Hihatsu tō, have been faced with sloping stone-faced wharves for the use of lighters; there is a depth of 4 feet (1^{m}2) in this creek. There is a pier, for the use of small craft, close eastward of the entrance to Goho sen.

Coal stores, connected with the railway, are situated on the eastern part of Katoku tō, which forms the eastern side of Goho sen; there are several coaling piers here.

The landing pier is close westward of the entrance to the basin, and there is also a pier at the quarantine station, situated about 4 cables north-eastward of Nanho saki.

Lights.—Buoys.—A light is exhibited, at an elevation of 57 feet (17^{m}4), from a white iron framework structure, 34 feet (10^{m}4) in height, situated on the extremity of Hihatsu tō.

A light is exhibited from the flagstaff on Manryoki saki (*Lat. 38° 43′ N., Long. 125° 23′ E.*).

Two conical buoys, painted red and black in horizontal bands, mark the edge of the reef which extends from the northern shore about 2 cables westward of the entrance to the basin.

Anchorage.—There is anchorage outside the basin, in depths of from 7 to 15 fathoms (12^{m}8 to 27^{m}4), mud or sand, not less than 2 cables offshore; the mud or sand has been deposited over hard rock bottom and the holding ground can scarcely be described as good. The anchorage near Hihatsu tō light-structure is not good; the tidal streams are very strong here, there is an eddy along the wall on the western side of the island, and the position is dangerous during the season of drift ice. A vessel has, however, anchored with Hihatsu light-structure bearing 300°, distant about 2 cables, and the conspicuous chimney on Ka tō in line with the south-eastern extremity of Kantō san, bearing about 044°, mud bottom and good holding ground; a little westward of this position the holding ground is bad. It is better to anchor in mid-stream, in depths of less than 10 fathoms (18^{m}3), where the tidal streams are not so strong and the holding ground is better.

Most vessels proceed alongside the wharves in the basin to work cargo, but if there is not room for them they must not anchor off the entrance and obstruct the fairway. During the ebb stream there is a strong eddy along the eastern wall of the basin, and vessels are liable to be swung round by it; it is difficult to proceed alongside or leave this wall between about one or 2 hours after high water and low water.

Charts 1257, 1256, 1262.

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Chart 1656, plan of Chinnampo kō.

Tidal streams.—In the middle of the river south-westward of Hihatsu tō light-structure the east-going stream runs from about 1¼ to 2 hours after low water till just before the next high water; the west-going stream runs from just before high water till about 1¼ to 2 hours after the next low water, that is from 7¼ to 8 hours. The maximum rate of the east-going stream is 3¼ knots, and that of the west-going stream 4¼ knots. Near the banks of the river the change of direction from east-going to west-going occurs from one to 2 hours earlier than in mid-stream.

Off the basin the main part of the east-going stream runs approximately up the middle of the river, but that of the west-going stream runs well over towards the basin; the maximum rate of the former is about 2¼ knots, and that of the latter nearly 4 knots. Owing to the irregularity of the contour of the banks westward of the basin, the tidal streams near the basin are very complex.

Chart 1656.

Directions.—*From the westward.*—Shō tō, Saki tō, and Toku tō (the islet about 4 miles northward of Shimai tō), are excellent marks for fixing the position of a vessel. Toku tō (the islet close off the northern extremity of Shō tō) should be steered for bearing about 090°, and when the lighthouse on Shimai tō bears 056°, keep it on that bearing; this leads between Naka su buoy and Shimo su light-buoy. At night keep in the *white* sector of Shimai tō light, visible between the bearings 053° and 060°. When about 2 miles from Shimai tō course should be altered to pass about 2 cables northward of that islet, and thence between Sekihoku kaku and the buoy about three-quarters of a mile northward of that point; Chiri tō is a useful mark to steer for, and it should be kept bearing about 080° from a position about one mile eastward of Shimai tō. At night, keep in the *white* sector of Shimai tō light, visible between the bearings 255° and 266°. When nearing San tō bring the leading beacons situated on a hill near Gori ho lighthouse in line, bearing 109°, which will lead through Hitō suidō; care must be taken, however, to avoid the 4-fathom (7m3) patch lying about three-quarters of a mile north-eastward of San tō. The remainder of the route to Chinnanpo kō presents no difficulty.

Chart 1257.

From the southward.—After passing westward of Hakurei tō (page 512) course should be shaped to pass not less than one mile westward of Chōsan kan, as the tidal streams are strong here; when Dai tō bears 066° steer for it on that bearing, and when Daikan gan, the rock close off Chōsan kan, bears 222°, keep it astern on that bearing. Thence steer for the eastern extremity of Shō tō, bearing 017°, so as to pass about one mile westward of Goryūchi saki.

Chart 1656.

When Hōka san (Hōkwa zan), a peak situated nearly 3¼ miles east-south-eastward of Biwa kan, is in line with Reisei saki (*Lat. 38° 32′ N., Long. 124° 59′ E.*), bearing about 039°, keep this mark on until Sekihoku kaku comes in line with Koku gan, bearing 017°, when steer for these latter marks in line, which leads between Banjō shō and Uchi su. When Reisei kaku bears 104° course should be altered to 355°, so as to pass between the northern end of Uchi su and the shoal lying about one mile south-westward of Biwa kan.

Vessels bound for Sekitō byochi or the anchorage northward of

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Chart 1656.

Seiyō tō (page 517) should alter course eastward when Koku gan bears about 090°, and then proceed through the channel between So gan and Nan kaku.

Vessels entering the Daidō kō should continue to steer 355° until Shimai tō lighthouse bears 056°, when proceed as directed for vessels from the westward.

Chinnanpo fu.—Chinnanpo fu is a large and prosperous city, with a population of 50,512 in 1935.

Pilotage.—Pilotage is optional. If an application for a pilot is made beforehand, the pilot will board the vessel off Shimo su light-buoy, or, if the weather is bad, off Shimai tō. There are two motor pilot boats, both painted black. During the season of drift ice it may be very difficult to embark or disembark a pilot.

Harbour facilities.—Provisions are plentiful. Water is laid on to the wharves in the basin, and there is a water-boat for supplying vessels in the stream. A fairly large stock of coal is maintanied.

There are three movable cranes on the basin wall, one capable of lifting 5 tons, and the other two 1½ tons.

There are numerous lights; tugs are available. During the drift ice season cargo is only worked in the basin, although in exceptional circumstances lighters might be used out in the stream.

Minor repairs only can be carried out.

There are two small hospitals.

Local storm signals, classes 1, 2, and 3, are displayed from the light-station on the southern extremity of Hihatsu tō; *see* page 38. There is also a storm signal station, maintained locally, on the reclaimed ground eastward of Nanho saki.

Chinnanpo is connected to the railway system of Korea, and to the telegraph and telephone system. There is a W/T station; *see* page 48. There is steamer communication with Shanghai, Tientsin, Chefoo, Dairen, Japan and Formosa, and with Korean ports.

Trade and shipping.—The principal exports are rice, soya beans, coal, iron, and paper; imports are iron, coal, hardware, fertilisers, oils, chemicals, and textiles.

In 1934, 721 vessels with an aggregate of 992,627 tons entered the port.

Chinnanpo to Tetsu tō.—Light-buoy.—The bay on the southern side of the river, between Bōtatsuri saki and Goseki saki, a low, conspicuous headland, situated about 6 miles east-south-eastward, is filled by a mudbank which dries, known as Gansha. Seitai tō (*Lat. 38° 42′ N., Long. 125° 32′ E.*) lies on this mudbank about 1½ miles west-north-westward of Goseki saki and about 4 cables within the edge of the mudbank; there are depths of 3 fathoms (5^{m}5) and less for a further 3 cables outside this edge. The northern bank of the river should, therefore, be held off Gansha.

Gaigan kō (Gaigan misaki) is situated about 2½ miles south-eastward of Goseki saki and is the south-west point of a peninsula which extends southward from the northern shore of the river; this peninsula alters the course of the Daidō kō to a northerly direction. Tetsu tō is situated south-eastward of the extremity of this peninsula and forms the opposite bank of the river. The Sainei kō enters the Daidō kō along the southern side of Tetsu tō. Rocks, which dry, extend about one cable off Kuromatsu saki, the western extremity of Tetsu tō.

Charts 1257, 1256, 1262.

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Chart 1656.

The channel along the north-western side of Tetsu tō is only about 3 cables wide and the tidal streams through it are very strong.

A light-buoy, painted red, and exhibiting a *red occulting* light *every ten seconds*, is moored southward of the rocks off Kuromatsu saki and in the entrance to the Sainei kō.

There is anchorage, in depths of from 8 to 9 fathoms (14m6 to 16m5), close to the south-western bank of the river and westward of Tetsu tō; the holding ground is good, but the tidal streams are strong and rotatory, and the anchorage is not recommended.

Prohibited anchorage.—A submarine telegraph cable crosses the river about three-quarters of a mile south-eastward of Goseki saki; anchorage is prohibited within about a quarter of a cable on either side of this cable.

Tidal streams.—In the middle of the fairway off Tetsu tō the tidal streams change from a north-east to a south-west direction about the time of high water at Kenjiho, and from a south-west to a north-east direction about one hour after low water at that place; the stream runs in a south-west direction for from 7 to 7½ hours, with a maximum rate of 7½ knots. The maximum rate of the stream running in a north-east direction is 5 knots.

Sainei kō.—The Sainei kō is shallow, and there is a least depth of 1½ fathoms (2m7) in the fairway off the south-western side of Tetsu tō; just above this island the depths increase slightly, and there is anchorage for small vessels in depths of from 3½ to 4 fathoms (6m4 to 7m3), mud. Thence the depths decrease again, and Sainei, situated about 13 miles farther up, can only be reached by boats.

Tetsu tō to Kenjiho.—Buoy.—Anchorage.—The Daidō kō from the northern end of Tetsu tō to Kenjiho, a distance of about 5 miles, has depths of from 6 to 13 fathoms (11m0 to 23m8) in the fairway, but in two places this is only about one cable wide. Hiro su, a shoal with depths of less than 3 fathoms (5m5), extends from the eastern bank of the river and about 1½ miles above the northern end of Tetsu tō; the channel here runs close along the western bank. A red conical buoy, surmounted by a triangle, is moored off the western side of Hiro su.

Hira saki is a low, conspicuous point on the west bank of the river and nearly 4 miles northward of the north-west point of Tetsu tō. A shoal, with a depth of 3½ fathoms (5m9) on its outer end, extends about 3½ cables from the shore close southward of Hira saki; there is a deep passage, about 1½ cables wide, along the eastern bank here.

Kenjiho (*Lat. 38° 45′ N., Long. 125° 38′ E.*) is an important town situated on the eastern bank of the river. A hillock, 138 feet (42m1) high, is situated on the bank of the river and about 3 cables southward of the town, and a reservoir stands on another hillock on the southern side of the town; two powerful lights, one *red* and the other *white*, on a mast on the edge of this reservoir, are a good mark at night. Some ironworks are situated about half a mile north-westward of the 138-foot (42m1) high hillock, and there are two conspicuous chimneys on the river bank fronting them; the western chimney is white and the eastern is black. Another good mark is the tall black building of a briquette factory, situated at the mouth of the Kōshū sen, which flows out nearly half a mile south-eastward of the 138-foot (42m1)

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Chart 1656.

high hill. Kenjiho is connected to the general railway system of Korea, and to the telegraph and telephone systems. The population was 17,327 in 1935.

Kenjiho kō, the harbour off Kenjiho, is available for vessels of 5,000 tons, and there is sufficient space for several vessels of 3,000 tons. A shoal, with depths of less than 3 fathoms (5^{m}5), extends about one mile south-eastward from the north-eastern side of the river nearly one mile above Kenjiho; Naga su is situated on the south-western part of this shoal, and has depths of from 2 to 6 feet (0^{m}6 to 1^{m}8) over it. The holding ground in the river above the 138-foot (42^{m}1) high hill is poor, as the bottom is rocky, but southward of this hill there is a thicker deposit of mud; there is also mud bottom southward of a hill, 117 feet (35^{m}7) high, situated close westward of the ironworks. Cargo is worked by lighters. The best landing place is at some steps on the wall of the ironworks. Provisions are obtainable, and fresh water is delivered by water-boats. In 1934, 146 steam vessels totalling 257,238 tons entered the port; the largest vessel was of 6,037 tons, and vessels with a draught of 24 feet (7^{m}3) have proceeded up to Kenjiho.

Tidal streams.—In the narrow channel westward of Hiro su the north-going tidal stream turns to the south-going stream 5 minutes after high water at Kenjiho, after running for from 5 to 5½ hours; the south-going stream turns to the north-going stream about 40 minutes after low water at Kenjiho, after running for about 7 hours. The maximum rate of the north-going stream is 3½ knots, and that of the south-going stream 4½ knots.

In the middle of the river off Kenjiho the stream running north-westward turns south-eastward about 1 h. 10 m. after high water; the stream running south-eastward turns north-westward about 1½ hours after low water, after running for about 6½ hours. The maximum rate of the stream running north-westward is 3½ knots, and that of the stream running south-eastward 4 knots. Although there is no period of absolutely slack water, the stream is very weak for about half an hour during the turn from north-westward to south-eastward. The tidal streams close in to the banks of the river usually turn about one hour earlier than in mid-stream.

Charts 1656, 1257.

The river above Kenjiho.—Above Kenjiho the river is much obstructed by shoals, but it is navigable as far as Hosan (Posan), about 12 miles above Kenjiho, by vessels not exceeding 12 feet (3^{m}7) in draught. Vessels with a draught of less than 10 feet (3^{m}0) can reach Kasekiri, about 5 miles further up, but above this the river is only available for small craft.

Chart 1257.

COAST.—The coast between the northern side of the entrance to the Daidō kō and Tetsuzan hantō (Chorosusan peninsula), which lies with its southern extremity about 56½ miles north-north-westward of Shimai tō (page 517), is indented by an extensive bay, in which are numerous shoals and banks which dry; the shores of this bay are fringed by flats, which dry, extending as much as 7 miles offshore in places.

Ka (Ha) tō (*Lat. 38° 49′ N., Long. 125° 08′ E.*) lies on the coastal

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Chart 1257.

bank which extends from the southern part of this coast and about 10¾ miles north-eastward of Shimai tō; it is partly cultivated, devoid of trees, and inhabited. It is difficult to identify from a distance, as it is of the same colour as the coast behind. The coast between Ka tō and Nan ho (Nam po), about 17 miles northward, is mostly low and flat, with numerous saltpans, and can only be approached by boats at high water. A few miles inland are ranges of hills and mountains, the highest being Useki (Usoku) san, 1,847 feet (563m0) high, with the famous castle of Ōryū Jō on it, situated about 9 miles north-eastward of Ka tō. Hai hō, 1,226 feet (373m7) high, and Soga san, 1,010 feet (307m8) high, are prominent peaks, situated about 1¼ and 2½ miles, respectively, northward of Useki san. A fairly level ridge runs for about 9 miles in a northerly direction from Soga san, the highest peak being Yogan san, 1,360 feet (414m5) high, situated about 3½ miles northward of Soga san. All these peaks appear like a chain of high islands when seen from a distance of about 10 miles offshore.

Nan-Sō-ō (Nanjogafu) tō, about 3¼ miles northward of Ka tō, is a conspicuous islet with a group of trees on its summit; there are a few houses on the cliff on its north-western side. A group of rocks, the highest of which dries 17 feet (5m2), lies about 2¼ miles west-south-westward of Nan-Sō-ō tō. Hō-ō ho (Hoam po), a basin which dries except for a narrow channel, is entered about 7 miles north-north-eastward of Nan-Sō-ō tō; the northern side of this basin is formed by a long, narrow sandspit, and on the inner end of this spit is a large rock, 59 feet (18m0) high, with a conspicuous dark wood close southward of it. Niō tō (Iaku somu) consists of two reddish-brown islets lying between 3½ to 4 miles northward of the northern entrance point of Hō-ō ho; there are innumerable rocks, which dry, around these islets. Hoku-Sō-ō (Puchogapu) tō lies about 6 miles north-eastward of the northern entrance point of Hō-ō ho and off the entrance to Nan ho; the cliff on its western side is 164 feet (50m0) high, and the eastern end is a sand spit; there are some houses on the northern side of this islet, and four groups of pine trees on the southern side. Nan ho dries except for a narrow channel, available for boats at high water; there are salt pans along the southern side of this creek.

The coast between Hoku-Sō-ō tō and the southern entrance point of Chinbō ho (Chimbagu po), about 13 miles north-eastward, is cliffy, and consists of several hilly peninsulas with bays or creeks between, but they all dry. Kasen tō (Hasuru somu), situated about 2¼ miles northward of Hoku-Sō-ō tō, is a small peninsula, 70 feet (21m3) high, covered with pine trees; Sen tō, a flat-topped islet 36 feet (11m0) high, lies close offshore and about half a mile northward of Kasen tō. Kokuju hō, 1,095 feet (333m8) high and the highest hill along this part of the coast, is situated about 5 miles eastward of Kasen tō. Zai-ichi ho (Cheip po) is a small bay entered about 2 miles northward of Kasen tō. Tan (Su) ho, the next bay northward, has three islets in it and some salt pans at the head. Gaba ho (Kama po), nearly 2 miles north-eastward of Tan ho, penetrates the land for about 4½ miles in a south-easterly direction, but the upper half is all salt pans; two islets, covered with pine trees, lie close off the southern entrance point, and there is a house and a temple on the northern one. Endai hō, a hill 295 feet (89m9) high, situated on the northern side of the entrance to Gaba ho, is conspicuous. Kansen kō (Hanchom po), about 2¼ miles

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north-eastward of the northern entrance point of Gaba ho, is entered by a channel available for boats within about 3 hours of high water. Chinbō ho (Chimbagu po), about 2¼ miles north-eastward of the northern entrance point of Kansen kō, has a hill 335 feet (102m1) high, surmounted by a beacon tower, on its southern entrance point; the channel runs along the southern shore, and it can be used by boats within 3 hours of high water, but with the rising tide the stream rushes into the inlet with such force and volume that small craft may be capsized.

The coast between the southern entrance point of Chinbō ho and the mouth of the Seisen kō (Chonchon kagu), about 19½ miles northward, is flat and low, consisting mostly of salt pans and marshes; in many places the coastal bank is only covered at high water spring tides.

The Seisen kō and the Dainei kō (Tainin kagu) flow along the southern and northern sides, respectively, of Hakusen hantō (Pakuchon peninsula), and have a common estuary. Anshū yu (Anju), situated about 8 miles up the Seisen kō, is the most important market town in Western Korea, except Heijō; in 1935 it had a population of 18,262. Hakusen, the principal village on the Dainei kō, is situated about 12 miles above its mouth. Anshū yu and Hakusen can only be reached by small craft not exceeding 6 feet (1m8) in draught, by availing themselves of the tide.

The coast between the northern entrance point of the estuary of the Dainei kō and Seisen kō, situated about 10 miles west-south-westward of the extremity of Hakusen hantō, and Tetsuzan hantō is fronted by numerous islands, islets, and shoals. Rinkai (Imei) san, a peak 948 feet (288m9) high, is situated about 10 miles north-westward of the northern entrance point of the estuary of the Dainei kō and Seisen kō and about 3 miles inland. Ryōkan (Nonhan) san is situated about 3 miles north-north-westward of Rinkai san, and has the ruins of a castle on it. Hōgō san (*Lat. 39° 35′ N., Long. 125° 08′ E.*), on the coast about 5 miles southward of Rinkai san, is a rocky peak 538 feet (164m0) high, with some pine trees on its summit.

Islets and shoals.—Channels.—Oki no su extends about 6 miles northward from a position about 24 miles west-north-westward of Shimai tō (page 517); it has a depth of 3¾ fathoms (6m9) at the southern end and in the middle, and 3¼ fathoms (5m9) at its northern end. Piradesu su (Pylades shoal), with a least depth of 3¾ fathoms (6m4) over it, lies about 20 miles north-westward of Shimai tō; there are numerous shoals northward and north-north-eastward of Piradesu su, and the positions of these can best be seen on the chart. A 4¼-fathom (8m2) patch lies about 2¼ miles south-south-eastward of Piradesu su, and Kita no Hanare su, with a least depth of 5 fathoms (9m1) over it, extends about 5 miles southward from a position about 3 miles southward of this patch.

Nishi no su is a narrow sandbank which extends about 16 miles north-north-eastward from a position about 11½ miles north-westward of Shimai tō; it dries in two places near its northern end, and there are depths of from one foot (0m3) to 5 fathoms (9m1) over the remainder. Higashi no su, eastward and parallel to Nishi no su, has been described on page 516. Nishi suidō, the channel between Nishi no su and Higashi no su, and Higashi suidō, the channel between the latter and the coastal bank, are from one to 3 miles wide, with depths of from

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Chart 1257.

5 to 18 fathoms (9m1 to 32m9); they lead north-north-eastward until westward of the entrance to Kansen kō, which is the northern limit of navigation for vessels of moderate draught. Farther northward, to the estuary of the Seisen kō and Dainei kō, there are numerous banks which dry, with only narrow, shallow passages between them. Ka-Bōgyo (Hamaguu) tō, a rocky islet 28 feet (8m5) high, lies about 16 miles westward of the southern entrance point of Kansen kō; Jō-Bogyo (Sammaguu) tō, about 5 miles north-eastward of Ka-Bōgyo tō, is a rocky islet 47 feet (14m3) high. These two islets lie on a bank which dries over the greater part, and small craft proceeding to the Seisen kō proceed through the channel along the eastern side of this bank. Gaijun tō (Mechura somu), about 11 miles north-eastward of Jō-Bogyu tō, is a reddish-brown islet with a small clump of trees on its flat summit; it has cliffy coasts, and lies on a sandbank which dries.

Katsu tō lies about 3 miles north-north-westward of Gaijun tō, and is an islet 199 feet (60m7) high, with pine trees on its summit; its north coast is precipitous, and there are some houses on its east coast. Gai tō (Suku somu), on the coastal bank, about 1½ miles northward of Katsu tō, has two reddish peaks with some low white hills between; the north-western peak is 184 feet (56m1) high. There are numerous houses along the east coast of this island. There are numerous rocks above water and rocks which dry on the portion of the coastal bank which extends southward and westward from Gai tō; the most conspicuous of these is Inshōri tō, with a sharp summit 96 feet (29m3) high, situated nearly 1½ miles westward of Gai tō and on the eastern side of the mouth of the Tatsusen kō (Tarure Kagu). Gai-Shō (Weijan) tō and Nai-Shō tō lie on the mudbank, which dries, forming the western side of the mouth of the Tatsusen kō; Gai-Shō tō lies with its southern extremity about 2½ miles westward of Gai tō, and has two hills, the western and higher being 422 feet (128m6) high. Nai-Shō tō, close northward of Gai-Shō tō, has three peaks, the middle and highest of which has a dense wood of pine trees on its western shoulder.

Unmu (Ummu) tō lies about 7½ miles northward of Jō-Bōgyo tō, and is cliffy on its south-eastern side; Kuni tō, a conical islet 54 feet (16m5) high, lies about 3 miles south-westward of Unmu tō, and is almost connected to it by a sandbank. Kanjō retto is a chain of about 20 islets extending about 9 miles northward from Unmu tō. The approach channel to the Tatsusen kō runs through this chain, between Daikan tō (*Lat. 39° 29′ N., Long. 125° 07′ E.*), situated about 3½ miles northward of Unmu tō and 127 feet (38m7) high, and Chu tō, about one mile farther northward and 103 feet (31m4) high; a reef extends about half a mile southward from Chu tō, thus narrowing the channel to half a mile. Shō-Kanjō-rettō is another chain of islets running for about 4½ miles towards the coast in a northerly direction from an islet, 28 feet (8m5) high, situated about 3½ miles north-westward of Chu tō; Byō tō, the largest islet of this chain, lies about 6 miles north-north-westward of Chu tō and is 124 feet (37m8) high.

Islands, islets, and dangers southward of Tetsuzan hantō.—Light.—Rō tō (Napu somu), the southernmost of these islets, lies nearly 18 miles westward of Jō-Bōgyo tō and is a rocky islet with patches of grass; Sho-Rō tō lies close eastward of Rō tō and is a

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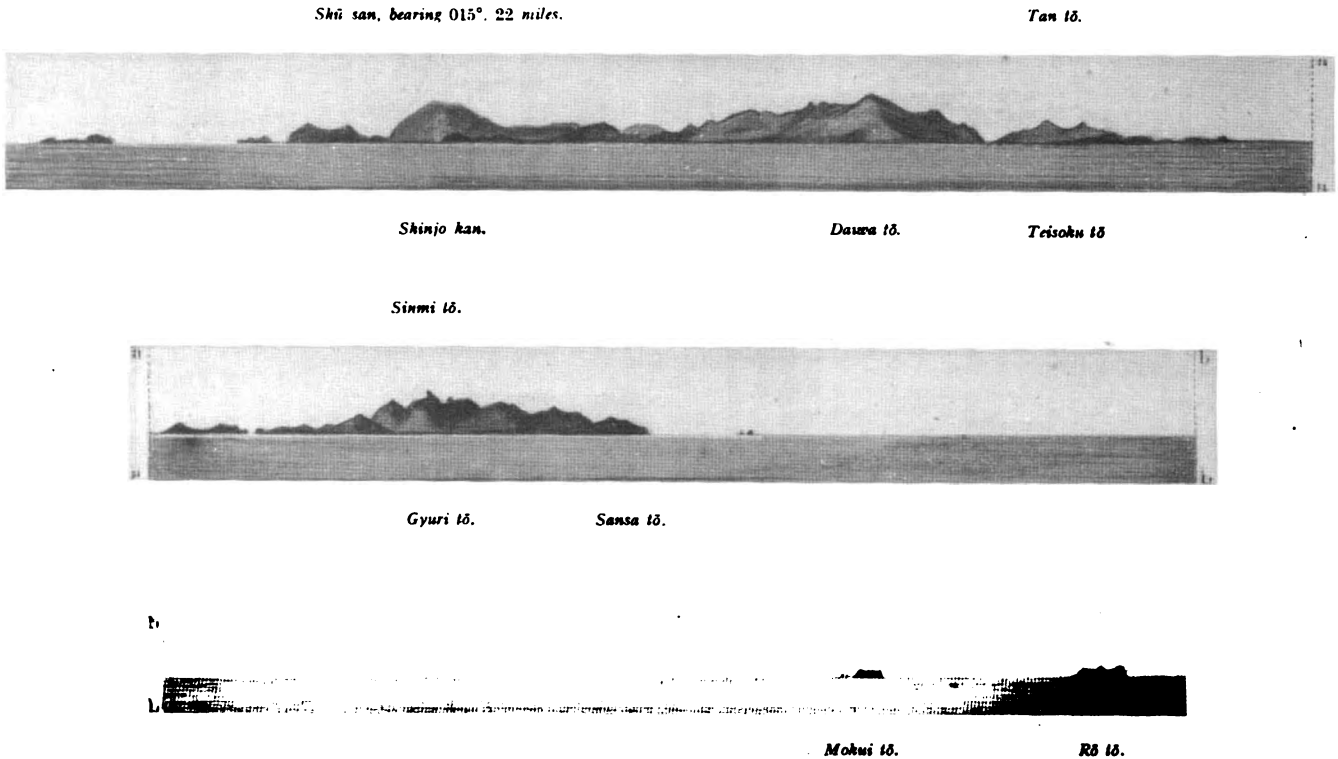

View, in three parts, of the approach to Sensen wan.

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similar islet. *See* view facing this page. A 3¾-fathom (6ᵐ9) patch lies nearly 2 miles south-westward of Rō tō, and there is a 4½-fathom (8ᵐ2) patch between; a rock, 22 feet (6ᵐ7) high, lies about 4 cables northward of the western extremity of Rō tō. Mokui tō lies about one mile north-eastward of Rō tō. These three islets are frequented by numerous sea birds, and at night or in foggy weather the cries of the gulls may indicate their positions.

Sansa tō (Chamuza), about 8 miles northward of Rō tō, is covered with shrubs, and rises steeply in the centre to a conical peak 605 feet (184ᵐ4) high. Teisoku tō consists of three islets lying close together, the southern of which is 83 feet (25ᵐ3) high and lies about 6 cables southward of Sansa tō; the summits of the two southern of these islets are densely wooded. Shotoki (Patsugu) tō, about 2 miles south-south-westward of Sansa tō, consists of two islets of about the same elevation; rocks above water and sunken rocks lie within a distance of half a mile south-eastward of these two islets. Seki tō, nearly 1¾ miles east-north-eastward of Sansa tō, is a small islet 106 feet (32ᵐ3) high, with cliffs of a reddish colour all round; its western side is thickly covered with low trees. Fū tō, about one mile northward of Sansa tō, consists of two hills joined together by a narrow neck of land; it lies on the southern part of a long narrow shoal, which dries in parts and has depths of less than 3 fathoms (5ᵐ5) over the remainder.

Gyuri tō (Urichā) lies with its southern extremity about one mile east-north-eastward of Fū tō and much resembles Sansa tō when seen from the westward, although the latter is more easily identified owing to its conical shape. Gyuri tō has but few trees on it, being mostly grass with a little cultivated land; there are a couple of houses on its northern side. Minbokuki (Murumbaiki) tō, about 2¼ miles south-eastward of Gyuri tō, is a small islet covered with dark green trees. Kanbokuki tō, about 2¾ miles north-eastward of Minbokuki tō, is a round islet covered with trees and reeds.

Sinmi (Shimmi) tō lies with its southern extremity about 2¼ miles north-eastward of Gyuri tō and is the largest island in this vicinity. A range of hills runs throughout the island from north to south and there is very little level ground; Unjū (Unjogu) san, the summit, is situated almost in the middle of the island, and Shichikaku san, 1,519 feet (463ᵐ0) high, is situated about half a mile westward, both being sharp, conspicuous peaks. The hills are mostly rocky, but, being covered with low trees and rough grass, they appear green when seen from a distance. On the southern extremity of the island is a conspicuous conical hill, 436 feet (132ᵐ9) high. In the middle of the west coast is a small peninsula, 505 feet (153ᵐ9) high, connected to the main island by a low isthmus; Saya ri is a small village on the northern side of this isthmus, and landing can be effected here when the bank which extends from this side of the island is covered. Shi tō (*Lat. 39° 30′ N., Long. 124° 52′ E.*), an islet 180 feet (54ᵐ9) high, lies close off the south coast of Sinmi tō, and about 1½ miles eastward of this islet is Sangetsu tō, a wooded islet 98 feet (29ᵐ9) high, with a rock, 26 feet (7ᵐ9) high, about a quarter of a mile southwestward of it. Chū tō, an islet 336 feet (102ᵐ4) high, lies nearly 1½ miles north-north-westward of the south point of Sinmi tō and on the bank, which dries, extending from the west coast of that island; its summit is covered with grass and there is scrub elsewhere.

Charts 1256, 1262.

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Naka no su is a sandbank which extends about 22 miles in a north-north-easterly direction from a position about 6 miles westward of Rō tō, until it joins the coastal bank which extends from the main coast northward of Sinmi tō; there is a depth of 3 fathoms (5^{m}5) on its southern extremity, and the depths in this vicinity are very irregular. Naka no su dries over a large area north-westward of Sansa tō.

Daiwa (Tefa) tō lies about 4½ miles westward of Sansa tō, and is a hilly island sloping down from its centre to a long, narrow point at its northern extremity, from which a rocky ledge, which dries, extends about half a cable northward. A shoal, with depths of only a few feet over it, extends as much as three-quarters of a mile from the northern part of the east coast, and a rock awash lies about a quarter of a mile north-eastward of the east point of the island; a shoal, with depths of less than 3 fathoms (5^{m}5), extends as much as 4 cables from the north-west coast. There is a small village on the eastern side of the island, and this part is well wooded. Daiwa su is a sandbank, with depths of from 1½ to 3¾ fathoms (2^{m}7 to 6^{m}9) over it, which extends fully 3 miles south-westward from the southern side of Daiwa tō.

A light is exhibited, at an elevation of 322 feet (98^{m}1), from a white hexagonal framework structure, 70 feet (21^{m}3) in height, situated on the western extremity of Daiwa tō.

Teisoku tō consists of three islets lying off the south-eastern extremity of Daiwa tō and separated from it by Daiwa suidō, a deep channel about 4 cables wide; Dai-Teisoku tō, the north-western and largest islet, is 253 feet (77^{m}1) high and is covered with coarse grass. A shoal, with depths of less than 3 fathoms (5^{m}5), extends about one mile northward from these islets.

Shō-Wa tō is an inhabited island lying nearly half a mile northward of Daiwa tō, and its summit, 397 feet (121^{m}0) high, is in the centre of the island; there is a green hillock, 213 feet (64^{m}9) high, on the south-eastern extremity. Haku-un tō lies close westward of Shō-Wa tō, and has a flat summit 321 feet (97^{m}8) high; the narrow passage between these two islands should not be used. Haku-un suidō, the passage between these two islands and the northern extremity of Daiwa tō, is deep in the fairway, but the navigable width is reduced to about 2 cables by shoals extending from either side.

Kai tō (Ho Yomu) lies about half a mile northward of Shō-Wa tō, and its summit, 416 feet (126^{m}8) high, appears sharp when seen from the southward. A pinnacle rock, 26 feet (7^{m}9) high, lies close off the north-west point of Kai tō and about half a cable westward of this rock are some rocks which dry 8 feet (2^{m}4). Heiseki tō is a flat islet, 69 feet (21^{m}0) high and covered with grass, lying about 1½ cables off the northern extremity of Kai tō; this islet lies on a shoal, with depths of less than 3 fathoms (5^{m}5), which extends about half a mile north-eastward from Kai tō. Kaitō suidō, between Shō-Wa tō and Kai tō, has depths of 7 fathoms (12^{m}8) and more in the fairway, but these depths decrease to from 3 to 4 fathoms (5^{m}5 to 7^{m}3) at the north-eastern end of the channel. Naka se, a black rock which dries 19 feet (5^{m}8), lies about 1½ cables southward of Kai tō, and reduces the navigable width of the channel to about 4 cables.

Tan tō is a rocky island lying with its south-western extremity about 2½ miles east-north-eastward of Kai tō. The summit of the island,

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situated slightly northward of the centre, is 992 feet (302m4) high, but about 4 cables southward of it is a conical peak 935 feet (285m0) high, which is more conspicuous from the westward. Tan tō is connected to Sho-Wa tō by a bank with depths of less than 2 fathoms (3m7) over it. Daizu tō, nearly half a mile southward of the south point of Tan tō, is a grassy islet with a flat summit, 123 feet (37m5) high. Ō se, about half a mile south-eastward of Daizu tō, consists of several black rocks from 4 to 6 feet (1m2 to 1m8) high; Ko se, about a quarter of a mile north-north-eastward of Ō se, dries 12 feet (3m7), and about 2 cables eastward of Ko se is a rocky patch with depths of less than 6 feet (1m8). Two islets and a number of rocks lie on the bank, which dries, extending about one mile north-north-eastward from the northern extremity of Tan tō.

Yū tō (*Lat. 39° 33′ N., Long. 124° 44′ E.*), is a conical island, 528 feet (160m9), situated about one mile north-eastward of the northern extremity of Tan tō; there is a prominent rock on its summit, and several others are scattered about its slopes. Shodai tō is a small islet, 57 feet (17m4) high, situated about 4 cables north-westward of Yū tō; it has a few stunted trees on its southern part, and it is a useful mark for vessels proceeding to Katō byōchi (page 532).

Ka tō lies with its south-eastern extremity about three-quarters of a mile north-westward of Tan tō, and is densely wooded with low trees; it is indented by several bays, all of which dry, and its western part is a long, narrow peninsula rising to an elevation of 361 feet (110m0), connected to the main island by an isthmus only about one cable wide. Endai san, the summit of the island, is situated in the middle of the eastern part, and is 1088 feet (331m6) high. The bay on the eastern part of the north coast, which penetrates the island in a south-easterly direction, is backed by a horseshoe-shaped ridge of hills, and a stone wall runs along its crest. Seibōchi, a densely wooded, conspicuous point, 374 feet (114m0) high, is situated in about the middle of the south coast of Ka tō; Todei sho, a wooded islet 53 feet (16m2) high, lies about 1½ cables southward of Seibōchi. Shinjō kan, the west point of Ka tō, is wooded with low trees; Tei tō, an islet 60 feet (18m3) high, covered with coarse grass and scrub, lies about 2 cables westward of this point.

A bank, which dries, extends as much as 1½ miles from the south coast of Ka tō, and on the edge of this bank is a small islet 150 feet (45m7) high, named Goku tō, which has a dark appearance owing to its dense growth of trees; a rock, which dries, lies about one cable eastward of Goku tō. Kita-Kuro se, about half a mile eastward of Goku tō, is a rocky reef, the highest part of which dries 21 feet (6m4); vessels should pass not less than 2 cables eastward of this reef, by keeping the north point of Haku-un tō bearing about 225°, and well open south-eastward of the eastern side of Kai tō. Gokutō suidō is the channel between Kai tō and Goku tō; the fairway through it, with depths of from 4 to 8 fathoms (7m3 to 14m6), is about 4 cables wide.

Sensen wan.—Anchorages.—Sensen wan is the area bounded eastward by Sansa tō, Gyuri tō, and Sinmi tō, and westward by Daiwa tō, Ka tō, and Tetzuzan hantō. In addition to Naka no su (page 530) there are numerous shoals and banks which dry, all running in a general north and south direction; the only good channel for vessels proceeding up to the head of this bay is along the eastern sides of Teisoku tō and Tan tō, thus passing westward of Naka no su.

Charts 1256, 1262.

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There is anchorage, sheltered from westerly and northerly winds, off the northern part of the east coast of Tan tō, in a depth of 7 fathoms (12m8), mud and sand, with the summit of Daizu tō in line with the south-eastern extremity of Tan tō, bearing about 211°. There is a valley, with a stream running down it, in the middle of the east coast of Tan tō.

A large sandbank, which dries, lies at the head of Sensen wan and between Yū tō and the south-east point of Tetsuzan hantō. There are three islands on the northern part of this sandbank; Shō-Kaji tō, the southernmost, lies about 3¼ miles northward of Yū tō and is 375 feet (114m3) high; there is some cultivated land and a few houses on its western side, and a hillock on its northern end is thickly wooded. Dai-Kaji tō (*Lat. 39° 38′ N., Long. 124° 45′ E.*), the middle and largest island, lies about half a mile northward of Shō-Kaji tō and half a mile south-eastward of the south-eastern extremity of Tetsuzan hantō, and is 506 feet (154m2) high; there are a few houses and some cultivated land on its north-western side. There is a channel about 2 cables wide, with depths of 5 fathoms (9m1) and more, between Dai-Kaji tō and the south-eastern extremity of Tetsuzan hantō, but only small vessels can anchor in it, as there is a bar at each end. Gyūri tō is situated close eastward of Dai-Kaji tō, and is 254 feet (77m4) high and covered with grass.

Chō tō lies nearly 2¼ miles eastward of Gyūri tō and is 316 feet (96m3) high; the western extremity of the island is a peninsula with a conical peak on it 223 feet (68m0) high, and there is a low dip between this peak and the summit of the island. The northern side of Chō tō is cultivated and there is a small village here. The coastal bank, which dries and on which Chō tō is situated, extends several miles from the coast here. There are several rocks above water between Chō tō and Gyūri tō, the principal being Sen tō, 46 feet (14m0) high, with a few trees on it, situated nearly half a mile eastward of the north point of Gyūri tō, and Shō tō, a white rock 54 feet (16m5) high, also having a few trees on it. Teisoku tō consists of three islets, the largest of which is 88 feet (26m8) high, and lies on the coastal bank about 2 miles south-westward of Chō tō.

There is good anchorage, in a depth of about 5 fathoms (9m1), about three-quarters of a mile eastward of the southern extremity of Gyūri tō.

Katō byōchi, in the channel between Ka tō and Tan tō, is a sheltered anchorage with all winds. This channel is from three-quarters to one mile wide, and has depths of from 5 to 11 fathoms (9m1 to 20m1) in the fairway; the bottom is mud and shingle or mud and sand, good holding ground.

Directions.—Vessels bound for the anchorage at the head of Sensen wan, from a position 10 miles westward of Rō tō (page 528) should steer for Shū san, bearing 015°, and seen midway between the western extremity of Shinjō kan (page 531) and the summit of the 361-foot (110m0) high hill just within that point; Shū san, about 5¾ miles north-north-eastward of Shinjō kan, rises up from the southern part of the west coast of Tetsuszan hantō to three conspicuous peaks, the middle and highest of which is 1,238 feet (377m3) high. *See* view facing this page. When Unjū san, the summit of Sinmi tō, bears 052°, and is just open south-eastward of the summit of Chū tō, steer on this mark, which leads about a quarter of a mile south-eastward of the

Charts 1256, 1262.

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Chart 1257.

rocks off the southern islet of Teisoku tō; after passing this islet gradually alter course northward till the summit of Tan tō bears 020°, which leads fully 6 cables westward of the large drying part of Naka no su. When the summit of Tan tō is distant about 3 miles steer north-eastward through the channel, barely 4 cables wide, between Daizu tō and Ō se; after passing through this channel steer for the summit of Chō tō bearing 034°. When Shō tō, the white rock 54 feet (16m5) high at the head of Sensen wan, bears 011°, steer for it on that bearing, and anchor with Shū san in line with the southern side of Dai-Kaji tō, bearing about 266°, in a depth of 5¼ fathoms (9m6), mud and sand.

Vessels bound for Katō byōchi, from a position 10 miles westward of Rō tō should steer for Shū san, bearing 015°, and seen midway between the western extremity of Shinjō kan and the summit of the 361-foot (110m0) high hill just within that point; *see* view facing this page. When the summit of Gyuri tō (the island south-westward of Sinmi tō) is in line with the southern islet of Teisoku tō, bearing about 072°, steer for the eastern side of Seibōchi, the point on the south coast of Ka tō, bearing 027°. A peak 800 feet (243m8) high, situated at the southern end of Tan tō, bearing 062°, leads through Kaitō suidō (page 530). When the dip in Chō tō comes in line with the western side of Shodai tō, bearing 044°, keep this mark on until Tei tō, the islet off the west point of Ka tō, bears about 313° and is just open northward of Heiseki tō, when alter course to 039° for the anchorage; the shoalest part of the channel is south-eastward of Heiseki tō (*Lat. 39° 30′ N., Long. 124° 37′ E.*), and the depth here is only about 3¼ fathoms (5m9).

Vessels can also pass westward and northward of Kai tō by continuing with the eastern side of Seibōchi bearing 027°, as previously directed, until the central peak on Tan tō, 935 feet (285m0) high, is in line with the northern side of Heiseki tō, bearing about 072°, when gradually alter course to 076°, heading for a position slightly southward of the central peak on Tan tō; when the northern extremity of Haku-un tō bears about 046°, and is well open south-eastward of Kai tō, alter course to 039° for the anchorage.

Vessels proceeding to Katō byōchi must exercise the utmost caution, as the tidal streams are strong and the banks and shoals cannot be detected even in calm weather; it also appears probable that the channels are liable to change.

Tetsuzan hantō.—Tetsuzan hantō (Chorusan peninsula) is hilly, and its highest peak, 1,274 feet (388m3) high, is situated about 4 miles north-north-eastward of Sa kan, the southern extremity of the peninsula. Getsuin tō, an islet 159 feet (48m5) high, covered with low trees except on its summit, lies close off the west point of the small peninsula which forms the southern extremity of Tetsuzan hanto.

Sensa wan is a narrow bay entered about 3 miles north-eastward of Sa kan, and penetrates the middle of the south-east coast of Tetsuzan hantō for about a mile in a northerly direction, but it dries throughout and is much encumbered by rocks; Sensa is a small village at the head of the bay. Yūsen hō is a conical hill 412 feet (125m6) high, with some conspicuous trees on its summit, situated on the eastern entrance point of Sensa wan; a black rock, 12 feet (3m7) high, lies about one cable southward of this point. The whole of this coast is fringed by a bank which dries and extends nearly one mile in places, and there are many rocks on it.

Charts 1256, 1262.

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Chart 1257.

Injō hō is the south-east point of Tetsuzan hantō and has a few houses on it. Ketsujin kan, the eastern extremity of the peninsula, is situated nearly 2½ miles northward of Injō hō, and small vessels can anchor about 2 cables off it in depths of from 2 to 2¾ fathoms (3m7 to 5m0), mud. Dō tō is a small islet lying on a narrow shoal about half a mile eastward of Ketsujin kan. About half a mile northward of Ketsujin kan the depths decrease abruptly to 6 feet (1m8) and less, but boats can proceed up a narrow creek to Bōtō ho, situated about 4 miles northward of this point.

The west coast of Tetsuzan hantō forms the eastern side of the estuary of the Ōryoku kō; it is indented by several bays, but they are all filled by mud flats which dry. About 4 miles northward of Shū san is a point with a conical hillock on it, 165 feet (50m3) high, having some small trees on its summit; rocks, which dry, extend half a mile southward from this point. Getsu tō, an islet 208 feet (63m4) high, lies about 1½ miles westward of this point and on the flat which dries out fully 2 miles offshore here; Getsu tō has a flat summit sparsely covered with trees and there are a few houses on its north-eastern side. A dark rock, 27 feet (8m2) high, resembling a boat under sail, lies about 1½ cables southward of Getsu tō, and about a quarter of a mile south-westward of this rock, on the outer edge of the mud flat, is a reddish rock 29 feet (8m8) high; Nondori, a rock 28 feet (8m5) high, lies on the outer edge of the mud flat and about one mile south-south-eastward of Getsu tō. About 2 miles north-westward of Getsu tō is a rocky headland rising to a sharp peak 195 feet (59m4) high; close south-westward of this headland, and connected to it by a ridge of rocks which dries, is Shō-Daikei tō, an islet 250 feet (76m2) high and covered with grass. Daikei tō, 410 feet (125m0) high, lies nearly half a mile northwestward of Shō-Daikei tō; some rocks, which dry, lie close off the south-west point of Daikei tō. A sandbank, named Kei sū, extends about 4 miles southward from Daikei tō; the northern part dries for about 2½ miles, and there are depths of less than 3 fathoms (5m5) on the remainder. Sen (Mami) tō is a conical islet, 137 feet (41m8) high, situated about 1½ miles north-north-eastward of Daikei tō; Toremi, about half a mile eastward of Sen tō, consists of some reddish rocks, the highest being 34 feet (10m4) high. Gyorō san is a conspicuous rocky hill, 828 feet (252m4) high, about 3¼ miles eastward of the north-east point of Daikei tō; Endai san (*Lat. 39° 47′ N., Long. 124° 33′ E.*), about 4 miles north-westward of Gyorō san, is an isolated hill rising steeply from a promontory on the western side of the peninsula, and is a sharp peak 650 feet (198m1) high.

Anchorage off the western side of Tetsuzan hantō.—Directions.—Chū-ō su is a narrow bank, about 7 miles long in a north and south direction, lying about midway between Daikei tō and En tō (Tsunguru somu), situated about 3¼ miles south-westward; between this bank and Kei sū is a channel from 3 to 6 cables wide, with depths of from 4 to 8 fathoms (7m3 to 14m6), sand and mud, where anchorage can be obtained.

Gyoei (Oyon) tō lies about 6 miles southward of Daikei tō and nearly 3 miles off the southern part of the west coast of Tetsuzan hantō, to which it is almost connected by banks which dry; its summit is a conical peak, 289 feet (88m1) high, with a large boulder on top. A rock, which dries 7 feet (2m1), lies about one cable off

Charts 1256, 1262.

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Chart 1257.

the east point of this island, and about 6 cables eastward of this point are some black rocks which dry 8 feet (2m4). A sandbank, known as Uwo-no-su, with depths of only a few feet and one patch which dries on its northern half, and from 3 to 5 fathoms (5m5 to 9m1) on its southern half, extends nearly 7 miles south-south-westward from a position about 3 cables westward of Gyoei tō; this sandbank lies on the eastern side of the approach to the anchorage. Tei tō lies about 1½ miles north-eastward of Gyoei tō, and its summit, 92 feet (28m0) high, is covered with grass and is of a reddish colour.

Vessels intending to anchor in the channel between Chū-ō su and Kei sū should approach with a peak 498 feet (151m8) high, situated about 1¼ miles north-eastward of Endai san, in line with the western side of Shō-Daikei tō, bearing 022°. When Shū san is in line with Tei tō, bearing about 104°, course should be altered to 356°, steering for a flat-topped hill 308 feet (93m9) high, with a single tree on its summit, situated on the mainland and about 7 miles north-north-westward of Endai san, and anchoring when Sen tō bears about 063°, in a depth of 6 fathoms (11m0), mud and shells; the maximum rate of the tidal streams here is 2¾ knots.

Chart 3652.

ŌRYOKU KŌ.—The Ōryoku kō or Yalu kiang is the longest river in Korea and forms the boundary between Korea and Manchuria. It rises in approximately Lat. 42° 10′ N., Long. 128° 20′ E., and flows in a general westerly direction to Chūkōchin, in approximately Lat. 41° 50′ N., Long. 127° 00′ E., where it turns south-westward to the coast. Its total length is 427 miles, and rafts, principally used for carrying down timber from the vast forests which border the upper reaches, can proceed up for 375 miles; on both sides of the lower reaches are vast stretches of arable land.

The mouth and estuary of the Ōryoku kō are encumbered with numerous sand and mud banks, large areas of which dry. The only practicable channels through these banks are Higashi suidō, on the eastern side of the estuary, and Nishi suidō, on the western side; the other channels are narrow and are constantly shifting. Nishi suidō is the channel most generally used, as the northern part of Higashi suidō is liable to shift and the depths are continually changing.

The fairway and depths in the river vary from year to year and from month to month, and the limits of the draught of vessels proceeding up the river are determined from time to time by the pilots. According to the latest information, in 1932, vessels with a draught of 13 feet (4m0) could reach the anchorage off Ryūganpo, situated on the eastern bank just above the junction of the Higashi suidō and Nishi suidō, at high water, and Shingishū, about 13 miles above Ryūganpo (*Lat. 39° 56′ N., Long. 124° 22′ E.*), could be reached by vessels with a draught of 9 feet (2m7).

The bottom of the river is fine sand, and usually a vessel is not damaged if she grounds, but in some places there are sudden drops where the depths change abruptly from about 8 feet (2m4) to 18 feet (5m5), and a vessel grounding here may capsize when the tide falls; if a vessel gets across the stream after grounding she will cause an eddy which will scour out the sand above her and pile it up below, so that she will be gradually buried.

Charts 1256, 1262.

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Chart 3652.

The buoys marking the channels are removed each year whilst the river is frozen, and are gradually replaced as it thaws; they are also shifted or altered, without announcement, to conform with alterations in the channel or depths.

Ice.—The river is practically closed to navigation from the end of October or beginning of November until the end of April or beginning of May. The ice starts to break up about three days later above the bridge at Shingishū than it does below it; when it breaks, the drift ice in the main stream above Ryūganpo is confined by the action of the tides to a limited area, and practically none of it is seen outside the mouth of the river.

Pilotage.—Pilotage is optional. Vessels requiring the services of a pilot should apply to the office of the Pilots' Association at Shingishū at least 24 hours before arriving off the entrance to Nishi suidō. Pilots board vessels off No. 2 light-buoy. There are three pilot boats, all being black motor-boats, and they fly a flag the upper half of which is white and the lower half red.

Vessels requiring a pilot for Higashi suidō are advised to pick one up at the entrance to Nishi suidō, as they do not usually meet vessels off Higashi suidō.

Higashi suidō.—Banjō rettō, on the eastern side of Higashi suidō, consists of four small islands and several rocky islets. En tō (Tsunguru somu), the eastern and largest island, has a somewhat pointed summit 252 feet (76^{m}8) high; a reddish rock, 28 feet (8^{m}5) high, lies about a quarter of a mile southward of this island, and there are several rocks around which dry. Satsu tō, about a quarter of a mile westward of En tō, is a flat-topped island 132 feet (40^{m}2) high, covered with grass. Chō tō lies about half a mile westward of Satsu tō, and there are two small islets between. Sui-un tō (Shurerii), the westernmost island of Banjō rettō, has a somewhat rounded top; it is connected to Chō tō by some rocks which dry, amongst which are two small islets. The fairway of Higashi suidō is close westward of Sui-un tō. All these islands lie on the extensive bank, which dries, extending about 3½ miles southward from the group and practically connected to the mainland northward; this bank is prolonged for about 6 miles in a south-south-westerly direction by Ban su, a shoal with general depths of less than 3 fathoms (5^{m}5).

Un (Kurumi) tō is a rocky islet about 2¼ miles northward of Sui-un tō; it lies on the western side of Higashi suidō and is a useful mark for that channel. Heki (Pyoku) tō is a reddish, rocky islet lying about 1¼ miles north-westward of Un tō. Kaji (Katchiri) tō, about 3¼ miles north-north-eastward of Un tō, is devoid of trees, almost flat on top, and has a beacon on it. Tashi tō (Tasarugi), about 1½ miles north-westward of Kaji tō, has two peaks, the northern being slightly the higher; a rocky ledge extends about 2 cables south-westward from it, and some rocks, which dry, lie within half a mile northward of the island.

Kakukan shi (*Lat. 39° 49′ N., Long. 124° 25′ E.*) is a rocky headland on the mainland and about 1½ miles northward of Tashi tō; the eastern side of this headland is precipitous, and the village of Kakukan shi is situated on the western side. Shō-Tashi to (Chaakun-tasarugi) is a rocky islet lying about a quarter of a mile south-westward of Kakukan shi; this islet has been levelled, and it is connected to

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Chart 3652.

Kakukan shi by a sea-wall. Shishi tō (Saajaayomu) is a peak, 250 feet (76m2) high, situated nearly one mile northward of Kakukan shi. About 1¼ miles eastward of Shishi tō is another isolated hill, about 220 feet (67m1) high.

Sai tō (Kanondori) is a rocky islet about 3 miles westward of Tashi tō, and it appears pyramidal when seen from the southward. Monhaku tō (Bunbegi), nearly 2 miles northward of Sai tō, is an islet in the shape of a truncated cone, with some coarse grass on it; there are some scattered rocks around. Monhaku tō lies on the north-eastern edge of a large bank, which dries, on the south-western side of Higashi suidō.

Endai san, a hillock 172 feet (52m4) high, with the remains of an old beacon on its summit, is situated on a point about 4¾ miles north-westward of Kakukan shi, and there is a sea-wall between these two points; the village of Shōko is situated at the western foot of Endai san, and landing can be effected here except at low water. Mira san is situated nearly 2¾ miles east-north-eastward of Endai san, and Tokusen (Tokuchon) san is about half a mile north-eastward of Mira san. About 2 miles north-westward of Endai san is a black, cliffy point 69 feet (21m0) high, which forms the eastern point of the mouth of the Ōryoku kō; Shō gan, a black, flat-topped rock, 55 feet (16m8) high, with a curiously shaped rock, 18 feet (5m5) high, close north-westward of it, lies nearly half a mile southward of this point, and Mairori tō, a rock 34 feet (10m4) high, with a rock which dries 10 feet (3m0) fully one cable south-westward of it, lies about 2 cables westward of the same point.

Light.—Buoyage.—A light is exhibited, at an elevation of 145 feet (44m2), from a white circular concrete tower, 21 feet (6m4) in height, situated on Sui-un tō.

A light-buoy, E. 1, painted black, and exhibiting a *white flashing* light *every six seconds*, is moored in the middle of the entrance to Higashi suidō and about 5¾ miles southward of Sui-un tō.

Higashi suidō is marked by red conical buoys on the eastern side, and by black conical buoys on the western side; these buoys are moved to conform with the changes in the banks and channel.

Anchorage.—Directions.—Tashitō byōchi is off the western side of Tashi tō and is included in the Port of Ryūganpo. Vessels with a draught of about 15 feet (4m6) can load and unload here, the goods being transported to and from Shō-Tashi tō by lighters; the best position is about half a mile westward of the northern peak on Tashi tō, in depths of from 3½ to 5½ fathoms (5m9 to 10m1), but there is only sufficient space here for one vessel at a time, and other vessels waiting usually anchor about 3 miles southward of Tashi tō. The various banks, which dry, lying south-westward of Tashi tō form a natural breakwater.

Vessels proceeding to Tashitō byōchi can enter Higashi suidō by passing either side of the light-buoy at the entrance; thence proceed in mid-channel westward of Sui-un tō and eastward of Un tō (*Lat. 39° 44′ N., Long. 124° 24′ E.*), and proceed up to the anchorage keeping the red conical buoys on the starboard hand and the black conical buoys on the port hand. Local knowledge is necessary.

Tidal streams.—In Tashitō byōchi and on the western side of Sui-un tō the tidal streams run in the direction of the channel. At spring tides in summer the tidal streams at Tashi tō turn about one

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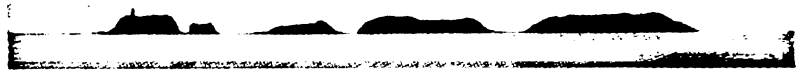
Chart 3652.

hour after high and low water, respectively. On the western side of Sui-un tō the north-going stream runs from one to 2 hours after lowwater till high water, and the south-going stream from high water till one or 2 hours after low water. The maximum rates during spring tides at Tashi tō are 3½ knots for the north-going stream, and 4½ knots for the south-going stream; westward of Sui-un tō the maximum rates are 2½ and 2¾ knots, respectively.

Nishi suidō.—This channel is used by all ocean-going vessels bound for Ryūganpo or for places farther up the river. The fairway is very liable to change, and the marks for it are being constantly altered; vessels are, therefore, advised to employ a pilot. Mudbanks extend for some miles off the coast, and there are few landmarks.

Shintō rettō consists of one island and several islets and rocks which lie in the estuary of the Ōryoku kō and between Higashi suidō and Nishi suidō. Shin tō, the largest island, lies in the centre of the group, with its eastern extremity nearly 8 miles westward of Tashi tō; it rises to sharp peaks at its northern and southern ends, and there is flat, cultivated land between them. There are several islets lying on the banks, which dry, eastward and southward of Shin tō; the largest of these, named Chū tō (Saaremi), lies nearly one mile eastward of Shin tō. Fusho kaku (Soguni rock) is an isolated black rock, 40 feet (12m2) high, situated nearly 1½ miles north-eastward of the north point of Shin tō. Ba-an tō lies nearly one mile westward of Shin tō and is the westernmost islet of the group. A large area of the bank northward of Ba-an tō and Shin tō is covered with grass and only covers at high water spring tides.



Ba-an tō lighthouse, bearing 018°, 17 miles. Shintō rettō.

The portion of the mainland which forms the north-western side of the estuary of the Ōryoku kō is flat, cultivated, and intersected by several streams. K'ulung shan point, the western entrance point of the estuary, is situated about 8½ miles westward of Ba-an tō, and mud flats which dry extend for about 3 miles in its vicinity; K'ulung shan is an isolated, thickly wooded hillock, 122 feet (37m2) high, situated about three-quarters of a mile north-eastward of this point, and appears as an islet from a distance.

Tatungkow (Taatonko) is a town on the coast on the western side of the estuary of the Ōryoku kō and is situated about 5 miles north-westward of Shin tō; timber is exported. A mud flat, covered with reeds, extends about 2 miles from the town, and a narrow channel, entered from Nishi suidō about 2 miles north-westward of Ba-an to, winds through this flat; the junks anchor off the entrance to this channel and proceed up to Tatungkow with the tide. The Custom house, consisting of two conspicuous red brick buildings, is at the south-western end of the town and the landing place is in front of it. Chaoshihkow (Chōsukō) is a village situated about 2 miles east-north-eastward of Tatungkow and at the mouth of a small river; landing

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Chart 3652,

can be effected here at all times. Changshan (*Lat. 39° 57′ N., Long. 124° 03′ E.*) is a bare peak, 525 feet (160m0) high, situated nearly 6 miles north-westward of Tatungkow, and a range of hills extends about 4 miles south-westward from this peak; this district is fairly densely wooded.

Lights.—Buoyage and beacons.—A light is exhibited, at an elevation of 245 feet (74m7), from a white circular brick tower, 20 feet (6m1) in height, situated on the south-western peak of Ba-an tō.

A light is exhibited, at an elevation of 25 feet (7m6) from a mast situated on the mud flat on the eastern side of the channel leading to Tatungkow.

A light-buoy, W.2, painted red, and exhibiting a *white flashing* light *every three seconds*, is moored off the entrance to Nishi suidō and about 10½ miles south-westward of Ba-an tō.

Red conical buoys mark the eastern side of the fairway, and black conical buoys the western side. There are also several beacons.

Tidal streams.—Near Shintō rettō the tidal stream runs north-eastward with the rising tide for a duration of about 5 hours, commencing about 1½ hours after low water at Sui-un tō; the maximum rate is 3¾ knots. With the falling tide the stream runs south-westward for a duration of about 7 hours, starting about one hour after high water at Sui-un tō; the maximum rate is about 3½ knots.

Outside the entrance to Nishi suidō and south-westward of Shin tō the tidal stream with the rising tide runs from about one hour after low water till about one hour after high water at Sui-un tō, and with the falling tide from about one hour after high water till about one hour after low water; the maximum rate is 1¾ knots.

The river.—Light.—Higashi suidō and Nishi suidō unite just within the entrance to the Ōryoku kō; the fairway then runs eastward for about 2 miles towards Ryūganpo (Yong am po) and then turns abruptly northward. The fairway is marked by red conical buoys on the eastern side, and black conical buoys on the western side.

A light is exhibited, at an elevation of 203 feet (61m9), from a red hexagonal masonry tower, 33 feet (10m1) in height, situated on the summit of a hill about half a mile south-westward of Ryūganpo. This light is known as Sampo light.

Ryūganpo kō, the harbour of Ryūganpo, is an indifferent anchorage, with no facilities for working cargo, and is only available for vessels not exceeding 13 feet (4m0) in draught; owing to the strong currents and tidal streams communication with the shore is sometimes impracticable.

Santaolangkow (Santanranto) is situated on the western bank of the river and about 6½ miles northward of Ryūganpo; there is a Custom house here and some quays; cargo is transported to and from Antung by lighters. In 1933, vessels with a draught of 15 feet (4m6) could reach the anchorage off the town at high water spring tides, and those with a draught of 11 feet (3m4) at high water neap tides. The maximum rate of the flood stream in ordinary circumstances is 3 knots, and that of the ebb stream 3¼ knots, but when the river is in flood the ebb stream may attain a rate of 5 knots, whilst the flood stream is scarcely perceptible.

Shingishū is situated on the eastern bank of the river and about 13 miles above Ryūganpo, and is the terminus of the Korean railway,

Charts 1257, 1256, 1262.

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Chart 3652.

although the trains run across the bridge just above the town and connect at Antung station with the Manchurian system. The population in 1935 was 58,462. Local storm signals, classes 1, 2, and 3, are displayed. The bridge is 33 feet (10^{m}1) above mean water level; there are customs' officials, police, and a guard at each end. There is good holding ground, sand and mud, below the bridge, in a depth of about 10 feet (3^{m}0), but the river is continually changing; the usual landing place is at the Customs pier.

Antung (*Lat. 40° 08′ N., Long. 124° 23′ E.*), situated opposite Shingishū and on the Manchurian side of the river, had a population of 93,292 in 1932. It has a considerable trade, but only about half is sea borne. The anchorage off the town is deeper than that off Shingishū, but a shoal, with a depth of about 2 feet (0^{m}6) over it, about 2½ miles below the railway bridge, prohibits the passage of steam vessels of any size. There are bunds where small vessels and lighters can lie alongside.

Charts 1257, 1256, 1262.

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CHAPTER XII.

THE NORTHERN SIDE OF HWANG HAI OR YELLOW SEA—FROM THE ŌRYOKU KŌ TO RYOJUN KŌ.

Chart 1256.

COAST.—The coast between K'ulung shan point (page 538), the western entrance point of the estuary of the Ōryoku kō, and the mouth of the Tayang ho, about 15 miles westward, is low, with hills rising some miles inland, and is fringed by a mud bank which dries out about 3 miles.

Between the mouth of the Tayang ho and the mouth of the Hekiryū (Hitsuri) ka, about 55 miles west-south-westward, the coast is mostly hilly and is indented by several bays, between which are conspicuous headlands. Except off some of the salient points the whole of this coast is fronted by mud flats, which dry out 2 or 3 miles and completely fill the bays; the depths are shoal for some distance seaward.

Chart 3388.

From the mouth of the Hekiryū ka to Jōsan tō (Terminal head), about 26 miles south-westward, the land near the coast becomes lower, and the coastal mud bank dries out for from 2½ to 4 miles until about 10 miles north-eastward of Josan tō; there are numerous salt pans along this part of the coast.

Chart 1256.

Tayang ho.—Light.—Buoys.—The Tayang ho rises in Lat. 41° 00′ N., Long. 123° 30′ E. and flows in a general southerly direction, receiving several tributaries on the way. Just before reaching the sea the river divides into two branches. The eastern branch flows eastward for a short distance and then turns southward, discharging into the sea through three narrow, shoal channels leading through the sand and mud flats. The western branch turns northward for a couple of miles through dense reed beds, then turns abruptly southward along the eastern side of the city of Ta-ku-shan (*Lat. 39° 54′ N., Long. 123° 35′ E.*), and finally rejoins the eastern branch about 1½ miles southward of the position where it branched off.

Several islands and islets lie on the banks at the mouth of the Tayang ho. Ta-lu tao, the southernmost and largest island, has a double summit, the highest point of which appears as a sharp peak from a distance; on the southern side of the island is a sandy beach which dries out about 6 cables. Mang shan, an islet 221 feet (67m4) high, lies close off the east point of Ta-lu tao and is connected to it

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Chart 1256.

by a reef which dries. The main channel leading to Tayang ho is entered about half a mile eastward of Ta-lu tao; there is a bar, which almost dries at spring tides, northward of Ta-lu tao, and within this bar the depths nowhere exceed 8 feet (2m4). The channel northward of Ta-lu tao is marked by two black conical buoys and one red conical buoy.

A light is exhibited, at an elevation of 248 feet (75m6), from a white circular steel tower, 28 feet (8m5) in height, situated on Mang shan.

Hsiao-lu (Siau lu) tao lies about 3 miles north-eastward of Mang shan and is a flat-topped island; a rocky ledge, which dries and has several rocks above water on it, extends about 6 cables south-eastward from the south-east point of Hsiao-lu tao.

Nan-yu-szu chiao, the western point of the mouth of the Tayang ho, is the extremity of a narrow peninsula, about 2 miles in length, which attains an elevation of 99 feet (30m2) at its southern end. Yuan shan, about 2 miles eastward of Nan-yu-szu chiao, is an islet 200 feet (61m0) high lying on the edge of the coastal bank which dries. Hsiao tao, about one mile northward of Yuan shan, is an island 163 feet (49m7) high, with several islets and rocks around it.

Ta-ku-shan road is outside the mouth of the river, and anchorage can be obtained about 3 miles south-south-eastward of the east point of Ta-lu tao, in a depth of about 4¾ fathoms (8m7); smaller vessels can anchor about 1¼ miles southward of this point, sheltered from north-westerly winds, in depths of from 3 to 3¾ fathoms (5m5 to 6m9), mud. Large junks anchor in the roadstead and discharge their cargoes into lighters; smaller junks proceed up the river and anchor off the city of Ta-ku-shan. The river is frozen over from the end of November till the beginning of March. Ta-ku shan rises steeply to an elevation of 1,101 feet (335m6) immediately northward of the city and is very conspicuous; there are two large shrines and a dense growth of trees in a ravine on the seaward side of the hill.

Coast.—Ch'eng-tsui-szu (Tunguz bay) is entered between Nan-chien-chiao, a point about 6½ miles westward of Nan-yu-szu chiao, and Wen-chia-lou, situated about the same distance farther westward. Styena point is situated about 15 miles westward of Wen-chia-lou, and rises to Dvuglavaya hill, about 3½ miles north-westward and 764 feet (232m9) high. Pan-la shan is situated about 2½ miles north-eastward of Styena point and is the western entrance point of Chuang-ho wan; the Chuang ho and a few other streams flow into this bay.

Western peak is situated about 19 miles northward of Styena point, and about 10 miles north-north-westward of Western peak is Mount Konus Dalni, both being conspicuous.

Off-lying dangers.—Beaver rock (*Lat. 39° 39′ N., Long. 123° 25′ E.*) lies about 6½ miles southward of Nan-chien-chiao and dries 17 feet (5m2).

Seal rock, about 7 miles westward of Beaver rock and 4½ miles southward of Wen-chia-lou, is a conspicuous pillar rock about 20 feet (6m1) high.

A rock, with a depth of 4 feet (1m2) over it, lies about 5 miles west-south-westward of Seal rock, and in 1925 the Chinese s.s. *Li-sheng* foundered on this rock; in 1933 there was a depth of only one foot (0m3) over this wreck. It is possible that other rocks may exist in this vicinity.

Chart 1262.

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Chart 3388.

Coast.—Islets and rocks.—Light.—The Hekiryū ka flows into the sea about 20 miles south-westward of Styena point, and is the eastern boundary of the Japanese leased territory of the Kwantung peninsula. The mudbank, on which are several islets, dries out for as much as 3 miles from the coast at the mouth of this river, and at low water there is only a narrow, shoal channel leading to the entrance. Sensan shi, a conspicuous green hill 292 feet (89^{m}0) high, is situated on the eastern side of the entrance. Jōshido tou is a village on the western side of the river and about 4 miles within the entrance; it is the terminus of the railway from Kinshū.

Hishika is a town on the coast about 11 miles west-south-westward of the western entrance point of the Hekiryū ka, and there are numerous salt pans along the coast between; in 1929 the population was 140,411. Hishika is a harbour for junks, and is somewhat protected by a ridge of rocks which extends about 4 cables southward from a point close eastward of the town; the coastal bank dries out for nearly 2 miles here, however, and junks are often left high and dry. Hishika is connected to the general railway system; there is a storm signal station, maintained locally.

A light, for the use of aircraft, is exhibited, at an elevation of about 190 feet (57^{m}9), from an iron framework tower, 49 feet (14^{m}9) in height, situated on the coast close eastward of Hishika.

Bagi tō (Ma tau), an islet 135 feet (41^{m}1) high, lies nearly 3½ miles eastward of Hishika and on the edge of the drying part of the coastal bank. Gyushin tō (Paskha), an islet 86 feet (26^{m}2) high, lies nearly 1½ miles southward of Hishika. Heitoshi (Pin tau), 99 feet (30^{m}2) high, is situated nearly 2 miles west-south-westward of Gyushin tō, and the coastal bank dries out as far as this island; reefs and rocks extend fully half a mile from its southern side. Chi shō, a rock which dries 11 feet (3^{m}4), lies nearly 1½ miles eastward of Heitoshi, and Oki shō, a rock which dries 12 feet (3^{m}7), lies about 4 cables south-eastward of Chi shō.

The Daisha ka flows out about 5 miles westward of Heitoshi, but the approach to it dries entirely. Seidai san, a hill 286 feet (87^{m}2) high, is situated on the coast about 2½ miles southward of the entrance to this river. The broad mudbank, which dries, and has hitherto fringed this coast, practically disappears at a point situated about 1½ miles south-westward of Seidai san. Koku tō (Kha tau), situated about 2½ miles eastward of Seidai san, is 160 feet (48^{m}8) high.

Ba dashi (Matuoza islet), about 6¾ miles south-westward of Koku tō and nearly 3 miles northward of Jōsan tō, is 69 feet (21^{m}0) high; a spit, which dries, extends about 1½ miles north-westward from Ba dashi, and a group of rocks, which dry, lies about 1½ miles north-north-eastward of this islet.

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Endai ō, entered between Ba dashi and Jōsan tō, has depths of less than 3 fathoms (5^{m}5) except over a small area northward of the latter. Dan dashi (Tan da), about one mile north-eastward of Jōsan tō, has the appearance of four rocks lying close together, the highest rock being 184 feet (56^{m}1) high; a rock, which dries one foot (0^{m}3), lies about three-quarters of a mile east-north-eastward of Dan dashi. Two rocks, with depths of 1½ and 2½ fathoms (2^{m}3 and 4^{m}6) over them, lie about three-quarters of a mile southward

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Charts 3388, 1798.

and one mile south-south-eastward, respectively, of Ba dashi. Jōsan tō (*Lat. 39° 09′ N., Long. 122° 10′ E.*) is a bluff 390 feet (118m9) high, with cliffs extending half a mile along its southern face, and is connected to the mainland by a narrow sandy isthmus. Nandai (Nan tai) shan is a conspicuous peak, 1,066 feet (324m9) high, situated about 5 miles westward of Jōsan tō. The Tōsha ka flows into the head of Endai ō, and there are salt pans at its mouth. Vessels loading salt usually anchor about a quarter of a mile off the southern shore of the bay, with Ba dashi bearing not more than 012°, sheltered from southerly winds.

Chart 3388.

OFF-LYING ISLANDS.—Bourchier group.—Sekijō (Shiishong) tō, the northernmost and largest of the Bourchier group, lies with its northern extremity about 4 miles southward of Styena point (page 542), and the passage between it and the main coast is shoal. The north-western part of the island is low, but a range of hills in the south-eastern part rises to an elevation of 702 feet (214m0). There is a bay on the north coast, but it dries throughout; a bank dries out for as much as one mile from the north-west coast, and there are two rocks above water on its outer edge. A rock, which dries 8 feet (2m4), lies nearly 2 miles north-eastward of the north point of the island. Seisho tō, a rocky islet 88 feet (26m8) high, lies about three-quarters of a mile off the north-east coast, and about one mile southward of this islet is Kyōka dashi, another rocky islet, 124 feet (37m8) high. Some rocks, one of which is 3 feet (0m9) high, lie about 7 cables off the south-east coast of Sekijō tō. Konsui dashi, a rocky islet 59 feet (18m0) high, lies about three-quarters of a mile south-westward of the west point of Sekijō tō, and within a distance of one mile south-eastward of Konsui dashi are two rocks, which dry 12 feet (3m7).

Sōroku tō lies with its northern extremity about 2 miles south-eastward of the east point of Sekijō tō and is 370 feet (112m8) high. A spit, with a rock which dries 15 feet (4m6) on its outer end, extends nearly half a mile north-westward from the north-west point of Sōroku tō. Sanryō shō, a rock, 68 feet (20m7) high, lies about one mile westward of the southern extremity of this island, and a rocky ledge extends about 3½ cables northward from it; a rock, which dries 2 feet (0m6), lies about 2 cables south-westward of the Sanryō shō. Foul ground extends a short distance from the southern extremity of Sōroku tō, and a rock, which dries 12 feet (3m7), lies about 1½ cables eastward of this extremity.

Genro dashi lies nearly one mile eastward of Sōroku tō, and is 223 feet (68m0) high; a rocky ridge extends about a quarter of a mile south-westward from its north-western extremity and terminates in a rock 27 feet (8m2) high. Shōōka tō (*Lat. 39° 30′ N., Long. 123° 06′ E.*) lies about half a mile north-eastward of Genro dashi, and is 252 feet (76m8) high. A rock, which dries 16 feet (4m9), lies about 3 cables northward of the north point of Shōōka tō, and about one mile north-north-westward of this rock is a large shoal with a least depth of 1¾ fathoms (3m2). A rock, 29 feet (8m8) high, lies about 2 cables east-north-eastward of the north point of Shōōka tō, and a rocky islet, 132 feet (40m3) high, lies close off the south-east point of the island.

Daiōka tō (Changi tao), the southernmost of the Bourchier group,

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Chart 3388.

lies with its north-western extremity about 3¾ miles south-eastward of the southern extremity of Sekijō tō; the summit of this island, 485 feet (147m8) high, is situated on the southern extremity, and near the centre of the island is a peak 344 feet (104m8) high. A rock, which dries 6 feet (1m8), lies about 3 cables southward of the south point of Daiōka tō; Hakuseki sho, 96 feet (29m3) high, is the outermost of the Seven Fingers, a group of rocks which extend about 6 cables south-eastward from the east point of the island. The bay between the south and east points has several rocks and reefs in it. There is a bay on the southern side of Daiōka tō, but the inner half is occupied by a reef, and some rocks, which dry 16 feet (4m9), lie about 2 cables south-westward of the eastern entrance point. The northern part of the west coast of the island is fringed with rocks and reefs to a distance of about 3 cables offshore.

A chain of islets and rocks extends from the eastern extremity of Daiōka tō to the southern extremity of Sōroku tō. Tan dashi, the southernmost islet, lies nearly 1¼ miles northward of the east point of Daiōka tō, and is 196 feet (59m7) high; some rocks above water and a rock which dries lie in the channel between. Chō dashi, the largest islet, lies about 2 cables north-north-westward of Tan dashi and is 157 feet (47m8) high; Sei dashi, 95 feet (29m0) high, lies nearly half a mile north-westward of the north point of Chō dashi, and is connected to it by a reef. Sō dashi, the northernmost islet, lies nearly half a mile eastward of the south point of Sōroku tō, and is 111 feet (33m8) high.

Gobō tō and adjacent islets.—Gobō tō (Wu ma tao) lies about 14 miles southward of the southern extremity of Sekijō tō, and has a conical summit 689 feet (210m0) high.

Hoku dashi, about one mile northward of the western extremity of Gobō tō, is a rocky islet 135 feet (41m1) high. Zen dashi, a rocky islet 240 feet (73m1) high, lies about half a mile eastward of Hoku dashi; a rock above water lies close off the west point of Zen dashi, and a similar rock lies about one cable off the east point of this islet. Within a distance of three-quarters of a mile eastward of Zen dashi is a group of three rocky islets, the middle one of which is 135 feet (41m1) high. Dai dashi is another group of three rocky islets, the eastern and highest of which is 158 feet (48m1) high.

Kaiyō tō.—Off-lying islands and danger.—Kaiyō to (Haiyung tao) lies with its north-western extremity about 11¾ miles south-eastward of Gobō tō. The summit of the island, 1,267 feet (386m2) high, is situated near the southern extremity, and thence a ridge runs through the island in a north-easterly and north-westerly direction, terminating in Genrō (Zoe head), a bluff 372 feet (113m4) high.

Hoku dashi (Gardiner island), 523 feet (159m4) high, lies close off the north coast of Kaiyō tō and is only separated from it at high water. Ganshi san (Arch rock), 118 feet (36m0) high, lies about 1¼ miles eastward of the north point of Hoku dashi, and a natural tunnel runs through it from east to west; another rock lies close off the northern side of Ganshi san. The passage between Ganshi san and Hoku dashi is deep and clear, except for a rocky patch, with a depth of 7 fathoms (12m8) over it, lying about one mile north-westward of the latter.

Nan dashi (Bessie island), about 2¼ miles eastward of the southern

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Chart 3388.

extremity of Kaiyō tō, consists of two parts connected by a reef; it has three hills, two on the eastern part and one on the western part, the latter, 323 feet (98m4) high, being the highest. Some rocks above water, and one which dries 10 feet (3m0) lie within one cable of the eastern extremity of Nan dashi; a rock, which dries 11 feet (3m3) and breaks, lies about 1¼ cables southward of the western part of the island. The channel between Nan dashi and Kaiyō tō is deep and clear.

Seinan shō (Chentien chiao), a rock with a least depth of 5 feet (1m5) over it, lies nearly 2¾ miles south-south-westward of Genrō and about 1½ miles off the west coast of Kaiyō tō.

Light.—A light is exhibited, at an elevation of 154 feet (46m9), from a white circular concrete tower, 25 feet (7m6) in height, situated on the point about half a mile northward of Genrō (*Lat. 39° 05′ N., Long. 123° 08′ E.*).

Anchorage.—Kaiyōtō wan (Thornton haven), on the west coast of Kaiyō tō, is entered between Genrō and a point about half a mile south-eastward, from which a reef, with a rock 37 feet (11m3) high on it, extends about half a cable northward. There are depths of from 6 to 20 fathoms (11m0 to 36m6) in the entrance, and thence the depths shoal gradually towards the head of the bay, which dries out for a quarter of a mile. There are several small villages along the shores of the bay.

Small vessels with local knowledge can anchor in Kaiyōtō wan, in depths of from 3½ to 4 fathoms (6m4 to 7m3), sheltered from all winds, but they will probably feel the swell that runs in with a strong westerly wind.

Magnetic disturbance.—Compasses are considerably affected by the magnetic rocks on Kaiyō tō.

Blonde group.—Blonde group consists of five islands, all of much the same character, having ranges of hills with deep valleys or ravines between, and bordered by cliffy coasts. Shōkō tō (Siauhau do), the easternmost island of the group, lies about 12¼ miles westward of Genrō and is 428 feet (130m4) high; Okakushō kō, the north-western extremity of this island, is a narrow peninsula which rises to an elevation of 207 feet (63m1); the north-eastern extremity is a steep bluff. A rock, 67 feet (20m4) high, lies close off the south-east point, and a rock, which dries 10 feet (3m0), lies nearly 2 cables off the south-west point. Ahatsu dashi (Sharp rock), 134 feet (40m8) high, lies about 1¼ miles southward of the south-west point of Shōkō tō.

Daikō tō (Tahau do) lies with its eastern extremity about 1½ miles north-westward of Ahatsu dashi, and is 500 feet (152m4) high. A rock, 182 feet (55m5) high, lies on the extremity of a reef, which partly dries, extending about 4 cables southward from the south point of Daikō tō; another rock, 100 feet (30m5) high, lies close northward of the first mentioned rock.

Tōtōren tō (Talin tao) lies with its southern extremity about three-quarters of a mile north-westward of the northern extremity of Daikō tō, and is 320 feet (97m6) high. Seitoren tō (Tosa tao), situated close westward of Tōtōren tō and connected to it by a reef, is 269 feet (82m0) high.

Shōshi tō (Changzu do), the westernmost and largest island of the group, lies with its northern extremity about 3 miles south-westward of

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Chart 3388.

Seitōren tō. Two ranges of hills, with a ravine between them, rise in the middle of the island; the western of these is 484 feet (147m5) high, and the eastern is 494 feet (150m6) high. Foul ground extends for about a quarter of a mile from the northern extremity of the island. There are two bays on the north-eastern side of Shōshi tō, and the north-western of these affords anchorage to vessels with local knowledge, sheltered from southerly and south-westerly winds, in depths of from 7 to 11 fathoms (12m8 to 20m1); a rock, which dries 5 feet (1m5), lies about 2 cables northward of the eastern entrance point of this bay. There is also anchorage, sheltered from easterly winds, in the bay on the west coast of Shōshi tō, in depths of from 7 to 11 fathoms (12m8 to 20m1).

Chart 1256.

Shisiau (*Lat. 38° 56′ N., Long. 122° 45′ E.*) lies about 4½ miles southward of the southern extremity of Shōshi tō, and is a rock 36 feet (11m0) high, standing on a flat, rocky ledge which extends about 2 cables all round; rocks, which dry, extend for about a quarter of a mile southward of this ledge. Shisiau appears at a distance like a junk under sail.

Chart 3388.

Elliot group.—Elliot group lies north-westward of the Blonde group and is separated from it by Gaichōsan suidō (Waichang shan channel), which is deep, free from dangers, and about 8 miles wide. The Elliot group consists of nine principal islands and numerous islets and rocks; it is one of the most important fishing centres in the Hwang hai.

Hashō tō (Baka tau), the easternmost island of the Elliot group, is situated nearly 8½ miles northward of Seitōren tō. Its summit, 506 feet (154m2) high, is situated in the southern part of the island; the eastern extremity is 394 feet (120m1) high and terminates in a cliff. Ginshi seki, a rock 83 feet (25m3) high, surrounded by a reef, lies about 4 cables south-south-westward of the south-east point of the island; a rock, with a depth of one foot (0m3) over it, lies nearly a quarter of a mile off the eastern part of the north coast, and a rock, awash, lies about a quarter of a mile off the western part of this coast.

The strait between the western extremity of Hashō tō and the eastern extremity of Shōchōsan tō, about three-quarters of a mile westward, is greatly obstructed by islets and rocks. San, Ni and Dai dashi (First, Second, and Third islets) lie on the southern side of the strait; Sashu dashi (Middle islet) and Hara dashi (Bouquet islet), which are connected to each other and also to the eastern extremity of Shōchōsan tō by reefs, lie on the northern side of the strait. Kaisai dashi (Krugli islet), 129 feet (39m3) high, lies nearly three-quarters of a mile north-north-eastward of Hara dashi; a rock, which dries one foot (0m3), lies nearly half a mile south-westward of Kaisai dashi.

Shōchōsan tō (Sauchanshan tau) is hilly along its south-eastern side, and rises to a maximum elevation of 486 feet (148m1) in about the middle of the south-east coast; the remainder of the island is much lower. Yōdashi sen (Hill point) is the southern extremity of an islet connected to the south point of Shōchōsan tō by a rocky ridge; a rock, which dries 4 feet (1m2), lies about 2 cables north-eastward of Yōdashi sen. Bojin kō (West bay), on the southern side of Shōchōsan tō, is entered between Yōdashi sen and a point about

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Chart 3388.

2½ miles north-westward; the north-eastern corner of the bay dries out fully 3 cables. Seikanshi (Utini rock), nearly 2 miles north-westward of Yōdashi sen, is 79 feet (24m1) high, and a rock, which dries 5 feet (1m5), lies about 1½ cables westward of it, with foul ground between; a 1½-fathom (2m7) patch lies about three-quarters of a mile south-eastward of Seikanshi. A rock, with a depth of less than 6 feet (1m8), lies near the head of the bay and nearly 1½ miles east-north-eastward of Seikanshi. The north coast of Shōchōsan tō is mostly fringed by reefs and shoals, which extend as much as a quarter of a mile offshore. A reef, with two islets on it, extends about 6 cables northward from a point about half a mile westward of the north-east point of the island; the outer islet is 129 feet (39m3) high, and a rock, which dries 13 feet (4m0), lies about a quarter of a mile eastward of it, with a rock awash between.

Sairi suidō (Sivuch strait), between the western extremity of Shōchōsan tō and the eastern side of Sairi tō, about one mile south-westward, has depths of from 6 to 9 fathoms (11m0 to 18m3) in the fairway, but there are several dangers in it. Daigōbō shō (Nadvodni rock), 25 feet (7m6) high, lies in the middle of the southern part of the strait and about 1½ miles westward of Seikanshi; a rock, with a depth of 3½ fathoms (5m9) over it, lies about 2 cables north-eastward of Daigōbō shō, and about one cable farther north-eastward is a rock with a depth of less than 6 feet (1m8). Foul ground extends into the middle of the strait from the eastern side of Sairi tō.

Sairi tō (Suili tao) has several hills on it, the highest, 316 feet (96m3) high, being situated in about the middle of the south-eastern side of the island. A shoal, with a least depth of 4 fathoms (7m0) lies about 4 cables north-north-eastward of the north point of Sairi tō, and the depths in this vicinity are very irregular. Three islets lie close off the north-west coast, and Satsuton shō, a rock which dries 8 feet (2m4), lies about 3 cables off the middle of this coast. Dai dashi (Otdyelni island), 247 feet (75m3) high, lies about a quarter of a mile off the southern extremity of Sairi tō and is connected to it by a reef.

Gōsen tō (Khasyan tau) lies with Daikō (Rocky point), its eastern extremity, about 2½ miles north-westward of the western extremity of Sairi tō, and is separated from that island by Gōsen suidō (Bobr strait), which is deep and free from dangers, except for the rock lying about 3 cables off the north-west coast of Sairi tō. The summit of Gōsen tō, 352 feet (107m3) high, is situated near the western extremity. Goko seki (Pyat stones) consist of several rocks, the highest being 89 feet (27m1) high, lying on a reef which extends about 3 cables south-westward from the south-west point of Gōsen tō (*Lat. 39° 13′ N., Long. 122° 30′ E.*); a detached rock, which dries 5 feet (1m5), lies close off the extremity of this reef. Foul ground extends about a quarter of a mile from the western extremity of Gōsen tō. The north coast is sandy, and is fringed by reefs which extend fully three-quarters of a mile from the western part, and terminate north-westward in Seishōkorō (Zamok rock), an islet 217 feet (66m1) high; Toshōkorō (Zeleni islet), about 1½ miles north-westward of Daikō, is connected to the coast by a sandy spit.

Daichōsan tō (Dachanshan tau), the northernmost island of the Elliot group, lies with its western extremity about 3 miles northward of Seishōkorō; its eastern part is separated from the northern side

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Chart 3388.

of Shōchōsan tō by Chōsan tō suidō (Yermak strait), which had depths of from 7 to 11 fathoms (12m8 to 20m1) in the fairway. A reef, with an islet 30 feet (9m1) high on it, extends about 3 cables from the eastern extremity of Daichōsan tō, and a rock, with a depth of 2 fathoms (3m7) over it, lies nearly half a mile eastward of this extremity. Kyōri tō (Ushi rock), 60 feet (18m3) high, lies nearly 1½ miles eastward of the east point of Daichōsan tō. Daikunō (Point Peschani) is situated about 1½ miles south-eastward of the east point of Daichōsan tō. Nearly 1½ miles westward of Daikunō is the extremity of a rocky ledge which extends about 6 cables from the south coast of Daichōsan tō; there are shoal depths between Daikunō and this ledge. Daiginwa seki (Pishnova rock), 47 feet (14m3) high, is situated about 2 miles westward of Daikunō and on the outer part of a rocky ledge which extends about 3 cables from the coast; a shoal, with depths of from 2¾ to 4 fathoms (5m0 to 7m3) over it, extends about half a mile south-westward from a position about 3 cables south-westward of Daiginwa seki. Kaiha dashi (Segment rock), 224 feet (68m3) high, lies about a quarter of a mile off the southern extremity of a peninsula which extends about a mile from the middle of the south coast of Daichōsan tō; there is no passage between the rock and the peninsula. A monument, 28 feet (8m5) in height, stands on a hill on the western side of this peninsula. Sōseki kō, a rock which dries 9 feet (2m7), lies about half a mile north-eastward of Kaiha dashi, and is marked by a white beacon consisting of an iron pillar, with a spherical cage topmark, on a hexagonal concrete base, 28 feet (8m5) in height. Kōseki kō, a rock which dries 10 feet (3m0), lies about 3 cables northward of Sōseki kō and is marked by a white wooden post, 16 feet (4m9) in height; a rock, with a depth of less than 6 feet (1m8) over it, lies about one cable south-eastward of this beacon. A rock, which dries 12 feet (3m7), lies about 3 cables north-westward of the monument on the peninsula and about 1½ cables offshore; the south coast of Daichōsan tō westward of the peninsula is fairly steep-to.

The north coast of Daichōsan tō consists to a great extent of bare, precipitous cliffs, fringed in places by reefs. Daikō shō (Ploski), a flat rock 16 feet (4m9) high, lies nearly one mile north-westward of the east point of the island; a shoal, with a depth of 2¼ fathoms (4m1), extends about one cable from the southern side of this rock. Sensen san (Mount Peschanaya) 322 feet (98m1) high, is situated on the coast about 1½ miles westward of Daikō shō, and, with Kaiha dashi (*Lat. 39° 15′ N., Long. 122° 35′ E.*) and the monument on the peninsula, is a useful mark for vessels proceeding through Gōsen suidō; from this direction it appears as a sharp peak. Robocho shō, a rock which dries 13 feet (4m0), lies about 1¼ miles west-north-westward of Sensen san and about 6 cables offshore. Daija dashi (Tabetkhoza island), 194 feet (59m1) high, lies about 3¾ miles west-north-westward of Sensen san and 2 cables offshore; it is connected to the coast by a sand spit. Kinjō seki, a rock which dries 5 feet (1m5), lies about 8 cables eastward of Daija dashi, and about half a cable northward of this rock is a rock which dries 2 feet (0m6). Enō dashi, an islet 73 feet (22m2) high, with an islet or rock close off its eastern side, lies about 6 cables north-eastward of the west point of Daichōsan tō and 3 cables offshore; a reef, with a depth of 2¼ fathoms (4m1) over it, extends about one cable south-westward from this islet.

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Chart 3388.

Off the southern side of Daichōsan tō is Seikaiseki hakuchi, a roadstead bounded northward by Kaiha dashi and the rocks lying north-eastward of it, southward by Sairi tō, and eastward by Shōchōsan tō; it affords anchorage in depths of from 5 to 12 fathoms (9m1 to 21m9). Vessels call here regularly to load salt.

Kakusen tō (Kosoin tau) lies with its eastern extremity nearly 3¼ miles south-westward of the west point of Daichōsan tō, and its coasts are mostly rocky and precipitous; the summit of the island, 218 feet (66m4) high, is situated in the south-eastern part. A reef, with two islets on it, extends about a quarter of a mile eastward from the east point of Kakusen tō, and Tetsumonkan, a rock which dries 11 feet (3m4), lies about half a mile east-south-eastward of this point. The depths within three-quarters of a mile of the north-eastern side of Kakusen tō are very irregular. Foul ground extends as much as half a mile around the western extremity of the island.

Chōsan sei suidō (Tunguz strait) is bounded northward by the western part of the south coast of Daichōsan tō, and southward by Kakusen tō and Gōsen tō. The northern side of the strait is deep and clear, but a narrow shoal, with depths of from 3¼ to 6 fathoms (5m9 to 11m0) over it, extends about 2 miles south-eastward from a position about 1½ miles southward of the west point of Daichōsan tō.

Kahi tō (Huapi tau) lies with its northern extremity about 1¼ miles southward of the southern extremity of Kakusen tō; its summit, situated in the middle of the island, is 267 feet (81m7) high. A shoal, with depths of less than 3 fathoms (5m5), extends nearly half a mile north-westward from the northern extremity of Kahi tō, Daisō dashi (Ploski islet), 132 feet (40m2) high, lies about 6 cables south-eastward of the eastern extremity of Kahi tō, with Shōsō dashi, 76 feet (23m2) high, between; there is foul ground around these islets, and a rock, 8 feet (2m4) high, lies about 4 cables south-eastward of Daisō dashi.

Kahi suidō (Gadamak strait), bounded eastward by Gōsen tō, and westward by Kahi tō and Kakusen tō, has depths of from 11 to 15 fathoms (20m1 to 27m4) in the fairway, but care must be taken to avoid the rocks on either side of the channel. A rock, with a depth of 1¾ fathoms (2m7) over it, lies about one mile south-westward of Seishōkorō; a rock, with a depth of 1½ fathoms (2m7) over it, lies in the middle of the northern entrance of this strait and about 9 cables west-north-westward of Seishōkorō.

Kakusen suidō (Vsadnik strait), between Kahi tō and Kakusen tō, has irregular depths; a shoal, with a least depth of 2¾ fathoms (5m0), lies in the middle of the western entrance, and a shoal, with a least depth of 3¼ fathoms (6m4) lies in the northern half of the eastern entrance.

Kōroku tō (Kwanglo tau), the westernmost island of the Elliot group, lies with its north-east point nearly three-quarters of a mile south-westward of the south-western extremity of Kahi tō, and is connected to it by reefs; its south-western part is high, rising to an elevation of 821 feet (250m2), whilst the remainder of the island is comparatively low and undulating. The north-eastern extremity is a peninsula 155 feet (47m2) high, connected to the main island by a narrow spit; a shoal, with general depths of less than 3 fathoms (5m5), extends about 1¼ miles north-westward from the north-western side of this peninsula and the south-western extremity of Kahi tō. Genhō dashi (Rulichi rocks) are four rocks surrounded by a reef which extends

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Chart 3388.

about half a mile southward of them ; the eastern and highest rock is 76 feet (23m2) high, and lies nearly 2 miles north-westward of the peninsula which forms the north-eastern extremity of Kōroku tō. A rock, with a depth of 7 feet (2m1) over it, lies about half a mile north-eastward of the 76-foot (23m2) high rock. The depths between Genhō dashi and the north coast of Kōroku tō are irregular.

Byōtō wan (East bay) is entered between the 155 feet (47m2) high peninsula and Kōshi tō (Huntun), an island nearly 2 miles southward, which is connected to the east coast of Kōroku tō by a sand spit ; Kōroku san (Kruisha islet), 355 feet (108m1) high, lies close off the eastern extremity of Kōshi tō and is connected to it by a sand spit. Seki dashi (*Lat. 39° 12′ N., Long. 122° 25′ E.*), a rock 40 feet (12m2) high, with foul ground extending about one cable around, lies in the middle of the entrance to Byōtō wan, and about three-quarters of a mile northward of this rock is Hanrō dashi, a rock 60 feet (18m3) high. Ryūjōkō wan (Koreetz bay), on the south-east coast of Kōroku tō, has depths of from 6 to 9 fathoms (11m0 to 16m5) in the entrance, decreasing gradually towards the head, except for a rock, with a depth of 3 fathoms (5m5) over it, lying almost in the middle of the bay ; a rock, which dries 13 feet (4m0), lies about 1½ cables north-eastward of the western entrance point. A conspicuous white monument, 20 feet (6m1) in height, stands on a promontory, 210 feet (64m0) high, which projects about a quarter of a mile from the eastern shore of the bay. Ryūjōkō wan is exposed to southerly winds, but it affords the only landing place on the island.

Rokuken shi (Rocky point), the southern extremity of Kōroku tō, rises steeply to Rōtetsu san, a conical peak 811 feet (247m2) high. A rock, 116 feet (35m3) high, lies close offshore and about 1½ cables eastward of Rokuken shi ; a rock, 8 feet (2m4) high, lies about 2 cables east-north-eastward of this rock. Hen dashi (Fantkhosa islet) lies about 1½ miles west-north-westward of Rokuken shi and nearly three-quarters of a mile offshore ; Haōkai (Pike rock), 132 feet (40m2) high, lies about 2 cables westward of Hen dashi and is connected to it by a reef. Hogyotoshi (Cherni point) is nearly 2 miles north-north-westward of Rokuken shi, and Sasenshi kō (Nizmenni point) is about three-quarters of a mile northward of Hogyotoshi, the coast between being fringed by reefs and shoals to a distance of about half a mile offshore. Koro tō (Lump island) is situated nearly one mile north-westward of Sasenshi kō, and is connected to it by a sand spit. Hoku kai (Vsadnik bay), on the northern side of Sasenshi kō, is entered between the north-east point of Koro tō and a point on the main island about 1½ miles eastward ; it has depths of about 5 fathoms (9m1) in the entrance, decreasing gradually towards the head. Menyō seki (Byeli rock), 13 feet (4m0) high, lies about 6 cables north-eastward of Koro tō ; Sōshoshi, a rock which dries 6 feet (1m8), with another rock close south-westward of it, lies nearly one mile north-eastward of Menyō seki. The depths are very irregular in the area between Koro tō, Genhō dashi, and the north-west coast of Kōroku tō.

Richōsan suidō.—Richōsan suidō (Lichang shan channel) is bounded north-westward by the coastal bank which extends from the coast of the mainland between the mouth of the Hekiryu ka and Jōsan tō, and south-eastward by the Elliot group. There are depths of over 7 fathoms in the fairway, but a shoal, with a least depth of 5

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Chart 3388.

fathoms (9m1), lies about 2 miles south-eastward of Koku tō (page 543); another shoal, with a least depth of 3¾ fathoms (6m9), lies about 1½ miles eastward of this island.

Chart 1798.

COAST.—The coast between Jōsan tō (page 544) and Nan shi (Minami point), about 4½ miles south-westward, is rocky, and broken, and rocks and shoals extend a quarter of a mile offshore in places; the village of Sokaton is situated on the banks of a stream which flows into a cove on the northern side of Nan shi.

Jōkō ō is a shoal bay entered between Nan shi (*Lat. 39° 07′ N., Long. 122° 05′ E.*) and Jōkō shi, situated about 3 miles southward; the Sei-un ka flows into the head of the bay, but its estuary dries. Jōkō shi is the extremity of a rocky peninsula, which rises to an elevation of 234 feet (71m3) and extends south-eastward from the flat land at the head of Stream bay, thereby separating that bay from Jōkō ō. Foul ground extends nearly three-quarters of a mile southward from Jōkō shi; Daikō (Tajo), a rock 17 feet (5m2) high, lies on the outer end of foul ground which extends about half a mile eastward of this point, and some rocks, which dry, lie within a distance of half a mile north-north-eastward of Daikō. A group of rocks, which dry 9 feet (2m7), lie about three-quarters of a mile north-north-westward of Daikō and on a shoal which extends nearly half a mile from the south-western shore of Jōkō ō. The bay is open south-eastward, and a swell from that direction always runs into it in summer, even in fine weather. The tidal streams off Daikō run south-westward with the rising tide and north-eastward with the falling tide; tide rips occur for about 1½ miles southward of Jōkō shi.

Stream bay is entered between Jōkō shi and Shagyo shi, about 5 miles west-south-westward, and has depths throughout the greater part of from 5 to 9 fathoms (9m1 to 16m5). Shagyo shi is a steep-to, wooded point; Dai san (Tai shan) is a sharp peak, 881 feet (268m5) high, situated about 2 miles north-north-westward of this point. The shores of the bay are rocky, except at the head, where there is a sandy beach with flat land behind; Kōreijō shi is a rocky islet close to the shore at the head of the bay. Sanryōsha is a group of yellowish rocks, 22 feet (6m7) high, lying off the entrance to the bay and about 3 miles eastward of Shagyo shi; foul ground extends about 1½ cables south-eastward and north-eastward of the group, and discoloured water is sometimes seen for about 6 cables south-westward and one mile north-eastward. A rock, which dries 3 feet (0m9), lies nearly 1½ miles westward of Jōkō shi and about half a mile offshore. A rock, which dries 2 feet (0m6), lies nearly one mile north-north-eastward of Shagyo shi and 4 cables off the western shore of the bay.

Shōyō kō is entered between Shagyo shi and Shōken shishi, about 2 miles south-westward; there are depths of from 3 to 7 fathoms (5m5 to 12m8) for fully one mile within the entrance, but a large area at the head of the bay dries. Shōken shishi is bordered by a shoal to a distance of a quarter of a mile.

Taiyō or Daiyō kō is entered between Shōken shishi and Hooper point, about 3 miles south-south-westward, and has depths of from 6 to 10 fathoms (11m0 to 18m3) in the entrance, decreasing gradually towards the head. Hooper point is the south-eastern extremity of Daikosan hantō, which separates Taiyō kō from Dairen wan; foul

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Chart 1798.

ground, on which is Sha tashi, an islet 16 feet (4^{m}9) high, extends about 6 cables eastward from Hooper point. Ruri tashi, an islet 52 feet (15^{m}8) high, is situated about 1½ miles northward of Hooper point and 4 cables off the western shore of the bay. Taiyō kō affords good anchorage in depths of from 3 to 5 fathoms (5^{m}5 to 9^{m}1), but it is open south-eastward, and a swell runs in from that direction in summer.

Chart 3694.

The south coast of Daikosan hantō, between Hooper point and Sansei tō, about 3½ miles westward, is fringed by rocks and reefs to a distance of from 2 to 3 cables in places; Kyusai (Kyubei) dashi, an islet 39 feet (11^{m}9) high, lies close off the southern extremity of the peninsula. Tonko (Koko) san, a peak 626 feet (190^{m}8) high, is situated about one mile northward of Kyusai dashi. About 2 miles south-eastward of the peninsula the tidal streams run west-south-westward, with a maximum rate of about 2½ knots, during the rising tide, and north-eastward, with a maximum rate of about 2½ knots, during the falling tide.

Off-lying rock.—Light.—Ken shō (*Lat. 38° 58′ N., Long. 121° 59′ E.*) is a reef lying about 3½ miles eastward of Hooper point, and its northern part is just above high water; there are depths of from 5 to 10 fathoms (9^{m}1 to 18^{m}3) for about half a mile north-westward and 1½ miles north-eastward of the reef.

A light is exhibited, at an elevation of 33 feet (10^{m}1), from a red tower with a black band, surmounted by a cylinder, 32 feet (9^{m}8) in height, situated on Ken shō.

Approach to Dairen wan.—Lights.—Dai-Sansan tō (South San shan tau) lies with its northern extremity about 3½ miles southward of Sansei tō, and is divided into two parts by a narrow neck of rocks and shingle; the southern part rises to an elevation of 523 feet (159^{m}4), and the northern part to 516 feet (157^{m}3). The island is fringed by a reef, which extends as much as one cable in places, and an islet, 66 feet (20^{m}1) high, lies about 1½ cables off its south-east coast; a bank, with depths of less than 10 fathoms (18^{m}3), extends about one mile from the east coast. Sansan ō, the bay on the western side of the narrow neck, has depths of from 4 to 5 fathoms (7^{m}3 to 9^{m}1).

A light is exhibited, at an elevation of 257 feet (78^{m}3), from a white circular stone tower, 33 feet (10^{m}1) in height, situated on the southern extremity of Dai-Sansan tō. A fog signal is sounded from the light-house. A wireless telephone is installed to give information to Dairen of the names and draughts of vessels on their way in.

Shō-Sansan tō (North San shan tau) lies about one mile northward of Dai-Sansan tō and is separated from it by Sansan suidō (San shan tau channel), which is deep and clear. Nai suidō or Inner channel, between Shō-Sansan tō and the southern side of Daikosan hantō, is also deep and clear.

Dairenwan nankō, the main channel of approach to Dairen wan, lies between Dai-Sansan tō and the coast of the mainland about 5 miles westward. Nan Zan shi (Nanshan tsui), the western entrance point to this channel, is situated about 6 miles westward of the southern extremity of Dai-Sansan tō. The coast between Nan Zan shi and Kōhaku shi (Howampo tsui), about 2½ miles north-north-eastward, is

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Chart 3694.

cliffy, except for a sandy beach in a bight about midway between these two points. Bōsui tō (Pantsui tau) lies about a quarter of a mile off this sandy head, with foul ground between, and rises to an elevation of 166 feet (51m0) at its western end, thence sloping down gradually to its east point, which is steep-to.

A light is exhibited, at an elevation of 271 feet (82m6), from a white square concrete structure, 25 feet (7m6) in height, situated on Kōhaku shi. A fog signal is sounded from the light-structure. There is a W/T beacon at the light-structure; *see* Admiralty List of Wireless Signals.

Chart 1798.

Outlying islet and rock.—Lights.—En tō or Round islet is situated nearly 20 miles south-eastward of the southern extremity of Dai-Sansan tō, and has a rounded summit 196 feet (59m8) high.

A light is exhibited, at an elevation of 219 feet (66m7), from a white square concrete structure, 39 feet (11m9) in height, situated on Round islet. A fog signal is sounded from the lighthouse. A wireless telephone is installed on the islet to give information to Dairen of the names and draughts of vessels proceeding to that port. There is a W/T D.F. station on Round islet; *see* page 42.

Chart 1256.

Gū gan or Encounter rock (*Lat. 38° 33′ N., Long. 121° 40′ E.*), about 26 miles west-south-westward of Round islet, is divided into two parts, the eastern and larger of which is 10 feet (3m0) high; when seen from the northward or southward it appears like a group of small rocks.

A light is exhibited, at an elevation of 59 feet (18m0), from a circular concrete tower, 50 feet (15m2) in height, painted red and black in horizontal bands, situated on the eastern part of Encounter rock. A fog bell is sounded from the lighthouse, except during August, September, and October.

Chart 3694.

DAIREN WAN.—Dairen wan is entered between Sansei tō and Kōhaku shi, and its shores are indented by several smaller bays; the whole of the western side is included in the limits of Dairen kō (page 565). In summer there is very good anchorage in the north-eastern part of Dairen wan, under the lee of Daikosan hantō.

Any of the three approach channels just described, namely Dairen-wan nankō, Sansan suidō, and Nai suidō, can be used by vessels bound for Dairen wan; Dairenwan nankō, the widest of the three, can be navigated by day or night, as there are lights on Rohen tō (page 566), Dai-Sansan tō, and Kōhaku shi. Rōko san (Laohu shan), situated at the head of Dairen wan and about 12 miles northward of Kōhaku shi, and Hitō san (Ai tō shan), about 11½ miles westward of Kōhaku shi, are fairly conspicuous. *See* view on chart 1798.

North-eastern side of Dairen wan.—Light.—Daiko (Taaku) kō, on the eastern side of Dairen wan, is entered between Sansei tō and Breaker point, nearly one mile northward. A reef extends about half a cable from Sansei tō; a reef, with some rocks which dry on it, extends about 1½ cables from Breaker point, and there are numerous rocks along the northern shore of the bay. A point, 15 feet (4m6) high, projects from the middle of the eastern shore, and there is a

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Chart 3694.

shrine at its inner end; a reef, with a rock which dries 6 feet (1m8) at its outer end, extends about one cable from this point. The village of Daikosan is situated southward of the shrine.

Small vessels can proceed into the bay with the shrine bearing 080°, which leads clear of the shoal, with a depth of 2¾ fathoms (5m0) on its outer end, which extends a quarter of a mile from the northern shore; they can anchor when the western side of Shō-Sansan tō is in line with Sansei tō, bearing about 180°, or just within that line as convenient. Daiko san (Taaku shan) has a double summit, the eastern and higher peak, situated about 4 cables east-south-eastward of Sansei tō, rising to an elevation of 464 feet (141m4); it is a good landmark for vessels bound for Daiko kō. The best landing place is on the southern shore, where boats can be drawn up on the beach at low water; at high water landing can be effected near the middle of the village. Sheep, poultry, eggs and fish are obtainable, but the local oysters are unsafe.

A light is exhibited, at an elevation of 40 feet (12m2), from a mast, 21 feet (6m4) in height, situated near the shrine at the head of Daiko kō.

The coast between Breaker point (*Lat. 38° 58′ N., Long. 121° 49′ E.*) and the eastern entrance point of Kōdotaishi kai, about 4 miles north-north-westward, is fringed by a narrow reef almost throughout, but there are no dangers outside a distance of one cable offshore.

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Kōdotaishi kai, in the north-eastern part of Dairen wan, is about 1½ miles wide at its entrance, and penetrates the land for about 3½ miles in a north-westerly direction, but the head of the bay dries out for about 1½ miles, and the greater part of the remainder has depths of less than 3 fathoms (5m5); it affords good shelter, however, for small vessels. Tōshi shi (To sui), the western entrance point, is the eastern extremity of Washo tō (Hosan tao), which separates Kōdotaishi kai from Ka tō, the next bay westward; although called an island, Washo tō is in reality a peninsula connected to the mainland by a low isthmus. Washo tō is bordered by a reef which extends as much as one cable, and there are depths of less than 3 fathoms (5m5) for from one to 2 cables offshore.

Chart 3694.

DAIREN KŌ.—Dairen kō, which comprises the whole of the western part of Dairen wan, is an excellent natural harbour with convenient depths, and has the great advantage of being in railway communication with Europe; the harbour includes the whole of the area of Dairen wan which lies westward of the line joining Kōhaku shi and Tōshi shi. Dairen kō is divided into several areas or sections, the most important being Futō ku or Hatoba ku, the artificial harbour off the town of Dairen.

Ice.—The ice season normally lasts from the early part of January to the beginning of March, and the hardest frosts usually occur in the first half of February. The ice-breakers employed have no difficulty in breaking up the ice in Futō ku, and vessels are always able to proceed alongside the moles.

Pilotage.—Pilotage is compulsory for vessels of 1,000 tons gross or more proceeding alongside or leaving any of the moles and piers, but not in other cases.

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Chart 1798.

Light.—A light for the use of aircraft is exhibited, at an elevation of about 717 feet (218m5), from an iron framework tower, 49 feet (14m9) in height, situated on the summit of Gyoku san, a peak about 3½ miles north-westward of the head of Dairen kō.

Chart 3694.

Sections of Dairen kō.—Hōhaku ku.—Light-buoys.—Hōhaku ku is the area immediately westward of the boundary line of Dairen kō; it is bounded westward by the line joining Kōhaku shi and Hokuchō (Pochan) san, a peak with a conspicuous white pillar on it situated about 6¼ miles north-westward, and northward by the line drawn from Tōshi shi to the point where the previous line cuts the coast. Hōhaku ku is the outer anchorage of Dairen kō and is open to all vessels. The depths vary from 4 to 7 fathoms (7m3 to 12m8), soft mud; the holding ground is not good, but with two anchors down vessels can lie anywhere without danger, except with winds between south-south-east and east-north-east, which cause a long swell. Large vessels can anchor, in a depth of about 5¼ fathoms (10m5), with Kōhaku shi bearing 180°, and the summit of Shō-Sansan tō bearing 107°. Smaller vessels can anchor northward of the northern breakwater of Futō ku (page 557) in a depth of about 4 fathoms (7m3).

The quarantine anchorage is in the western part of Hōhaku ku; *see* Article 4(*b*) of the Harbour regulations on page 562. The Quarantine station and leading lights are described on page 557.

The fairway through Hōhaku ku, for vessels proceeding to the moles in Kanseishi ku (page 559) is marked by four light-buoys, laid out in pairs, Nos. 1 and 2 being the outer pair, and Nos. 3 and 4 the inner pair: No. 1 lies about 3 miles northward of Kōhaku shi (*Lat. 38° 54′ N., Long. 121° 43′ E.*), and is a light-buoy, painted black, exhibiting a *white group flashing* light giving *two flashes every six seconds*; No. 2, nearly one cable northward of No. 1, is a light-buoy, painted red, exhibiting a *red group flashing* light giving *two flashes every six seconds*; No. 3 lies about 3½ miles north-westward of Kōhaku shi, and is a light-buoy, painted black, exhibiting a *white flashing* light *every three seconds*; No. 4, nearly one cable northward of No. 3, is a light-buoy, painted red, exhibiting a *red flashing* light *every three seconds*.

Jijikō ku.—Lights.—Jijikō ku is bounded north-eastward by the line joining Kōhaku shi and Hokuchō san, and westward by the alignment of the two lights on the breakwaters of the eastern entrance to Futō ku. The coast for about 1¼ miles north-westward of Kōhaku shi is fringed by reefs, rocks, and shoals, which extend nearly 3 cables offshore; Harokō (To rae) seki, which dry 5 feet (1m5), lie nearly one mile north-westward of Kōhaku shi and 1½ cables offshore.

Jijikō No. 2 pier extends about 1¾ cables in a north-easterly direction from the reclaimed land about 1½ miles north-westward of Kōhaku shi; in 1932 an area on either side of this pier was being dredged to a depth of 26 feet (7m9), with 33 feet (10m1) in the approach. There is a camber, with depths of from 10 to 16 feet (3m0 to 4m9), on the eastern side of the inner part of this pier.

A light is exhibited, at an elevation of 52 feet (15m9), from a circular concrete structure, 41 feet (12m5) in height, situated on the head of Jijikō No. 2 pier. The entrance to the camber is marked by a light on the head of each breakwater.

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Chart 3694.

Jijikō No. 1 pier, about 3½ cables westward of Jijikō No. 2 pier, is reserved for vessels loading and unloading dangerous goods and bean oil; there are pipe lines laid on to the pier from the oil tanks standing on the high ground close southward of it. There are depths of not less than 27 feet (8m2) on either side of this pier, and in 1932 the approach to it was being dredged to a depth of 29 feet (8m8).

A light is exhibited, at an elevation of 54 feet (16m5), from a white concrete structure, 40 feet (12m2) in height, situated on the head of Jijikō No. 1 pier.

The camber of the Quarantine station is situated about 3 cables westward of Jijikō No. 1 pier. The entrance to the camber is indicated by leading lights; the front light is exhibited, at an elevation of 23 feet (7m0), from a white concrete column, 23 feet (7m0) in height, on the eastern side of the entrance; the rear light is exhibited, at an elevation of 59 feet (18m0), from a white mast 60 feet (18m3) in height, situated about 2½ cables south-south-westward of the front light. These lights are in line bearing 198°, and they also indicate the eastern limits of the quarantine anchorage (page 556).

Futō ku.—Lights.—Buoys.—Futō ku, immediately westward of Jijikō ku, is enclosed by three breakwaters and has three entrances. The eastern entrance, between the head of the eastern breakwater and the eastern extremity of the northern breakwater, has depths of fully 5 fathoms (9m1), and there are about the same depths in the approach channel, which runs in an approximate 293° direction; the eastern entrance is the one generally used by ocean-going vessels. The northern entrance lies between the western extremity of the northern breakwater and the north-eastern extremity of the western breakwater. The western entrance lies between the south-western extremity of the western breakwater and a mole which extends north-eastward from the shore; a temporary breakwater extends south-eastward from the head of this mole, and the basin thus enclosed is reserved for harbour service vessels. The northern and western entrances are used by small vessels and junks, and they are usually closed by booms, to keep out drift ice, from early in December to the middle of March.

A light is exhibited, at an elevation of 34 feet (10m4), from a circular stone tower with a white lantern, 29 feet (8m8) in height, situated on the head of the eastern breakwater; a fog signal is sounded from this light-structure. A light is exhibited, at an elevation of 34 feet (10m4), from a circular stone tower with a red lantern, 29 feet (8m8) in height, situated on the eastern extremity of the northern breakwater. Submerged boulders extend for a short distance from the head of the eastern breakwater, and their outer limit is marked by a black conical buoy.

A light is exhibited, at an elevation of 62 feet (18m9), from a square iron structure, 55 feet (16m8) in height, the upper portion of which is painted red, situated on the western extremity of the northern breakwater. A light is exhibited, at an elevation of 61 feet (18m6), from a square iron structure, 56 feet (17m1) in height, the upper portion of which is painted red, situated on the north-eastern extremity of the western breakwater (*Lat. 38° 57′ N., Long. 121° 38′ E.*).

A light is exhibited, at an elevation of 26 feet (7m9), from a circular concrete tower with a red lantern, 22 feet (6m7) in height, situated on the south-western extremity of the western breakwater.

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Chart 3694.

A light is exhibited, at an elevation of 26 feet (7m9), from a circular concrete tower with a white lantern, 22 feet (6m7) in height, situated on the head of the mole south-westward of the western breakwater. Electric cables cross the eastern and northern entrances; anchorage near them is prohibited.

Four moles extend from the southern side of Futō ku; No. 1 mole runs along the inner side of the eastern breakwater, and Nos. 2, 3, and 4 are parallel to it and farther westward. Wharves A, B, and C are along the reclaimed land between the inner ends of these four moles. The berths at No. 1 mole are numbered 1 to 6, across the outer end and down the western side; at wharf A the berths are numbered 7 to 9, from the eastward; at No. 2 mole the berths are numbered 10 to 20, up the eastern side, across the outer end, and down the western side; at wharf B the berths are numbered 21 to 23, from the eastward; at No. 3 mole the berths are numbered 24 to 34, up the eastern side, across the end, and down the western side; at wharf C the berths are numbered 35 to 37 from the eastward. No. 4 wharf is under construction, and in 1936 only the eastern side had been completed; the berths along this side are numbered 38 to 52. The incomplete north-western corner of No. 4 mole is marked by a light-buoy, painted red, and exhibiting a *red fixed* light.

Hamamachi (Hamuchō) pier extends in an east-south-easterly direction from the reclaimed land in the western part of Futō ku, and encloses a small basin where vessels under repair can lie. A light is exhibited on the head of this pier, and a light is also exhibited on the head of a pier on the southern shore of the basin.

Dredging proceeds continuously in Futō ku, and there are depths throughout the greater part of from 4 to 6 fathoms (7m3 to 11m0); the bottom, of soft mud, is not good holding ground. The south-western part of Futō ku has depths of less than 3 fathoms (5m5), and a rock, with a depth of 2¼ fathoms (4m1) over it, lies about 3½ cables northward of the head of Hamamachi pier; a red conical buoy is moored off the north-eastern side of this rock. There are four mooring buoys in Futō ku, and two in the basin enclosed by Hamamachi pier.

The Harbour Construction office is situated on the western side of the basin enclosed by Hamamachi pier; the office for the general administration of the harbour is situated near the root of No. 2 mole, and is a large seven-storied building surmounted by a W/T D.F. station (*see* page 42). There is a conspicuous signal tower, known as No. 1 signal station, where berthing and storm signals are made, on the north-west corner of No. 2 mole; *see* pages 561, 562.

The most convenient landing places are at the root of No. 2 mole opposite the Harbour office, and in the north-west corner of the basin enclosed by Hamamachi pier. For harbour facilities, *see* page 565; for berthing signals, *see* page 561.

Rossia machi ku.—Light.—Buoys.—Rossia machi ku is the south-western part of Dairen kō and is the area immediately westward of Futō ku; it is bounded northward by the line drawn from the light-structure on the western end of the northern breakwater of Futō ku to Ko shi promontory, nearly 2½ miles west-north-westward, and includes Baka tō, the bay in the southern part of this area. To provide accommodation for the increasing junk traffic an artificial harbour has been constructed in the south-eastern part of Baka tō; this harbour is

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Chart 3694.

bounded south-westward by Rossia machi ni-ageba (Rosseia chō wharf), which extends in a north-north-westerly direction from a position about three-quarters of a mile south-westward of the western entrance to Futō ku. The harbour is protected seaward by Rossia machi breakwater, which runs in a north-easterly direction from a position nearly one cable north-westward of the head of Rossia machi ni-ageba; about 2 cables north-eastward of the latter, and parallel to it, is another mole, with a prohibited area off it marked by red conical buoys.

A light is exhibited, at an elevation of 20 feet (6m1), from a white circular concrete structure, 16 feet (4m9) in height, situated on the north-eastern extremity of Rossia machi breakwater.

In 1932 an area westward of Rossia machi ni-ageba had been dredged to depths of from 10 to 11 feet (3m0 to 3m4); there is a portion of reclaimed land, protected by a sea-wall, in the western part of Baka tō. Tokai tō, about one mile north-westward of the head of Rossia machi ni-ageba, is the extremity of a peninsula which forms the north-western side of Baka tō. Kōro shō (*Lat. 38° 57′ N., Long. 121° 36′ E.*), a rock 29 feet (8m8) high, is situated on a reef which extends about 4 cables north-eastward from Tokai tō; Kishi seki, a rock 10 feet (3m0) high, lies about half a cable northward of Kōro shō. A rock, with a depth of 1¼ fathoms (2m3) over it, lies about three-quarters of a mile east-north-eastward of Kōro shō.

Kanseishi ku.—Lights.—Beacons.—Buoys.—Kanseishi ku is that portion of Dairen kō which lies westward of Hōhaku ku and northward of Futō ku and Rossia machi ku. A coaling harbour, consisting of two wharves and a breakwater, has been constructed on the shore northward of the northern entrance to Futō ku; the breakwater extends about half a mile in a southerly direction, and berthing piers have been constructed on the western side of its southern part. A rocky shoal, with a least depth of 1¾ fathoms (3m2) over it, lies about 3 cables eastward of the breakwater and about the same distance offshore; south-westward of this shoal, and close to the breakwater, is a rock with a depth of 2½ fathoms (4m6). Kanseishi No. 1 wharf is parallel to the breakwater and about 1½ cables westward of it; it is fitted with railway lines and transporters, and there are depths of 32 feet (9m7) alongside. In 1934 reclamation works were in progress along the shore between the breakwater and No. 1 wharf. No. 2 signal station is situated on the eastern side of the root of this wharf. Kanseishi No. 2 wharf is situated about half a mile westward of No. 1 wharf.

A light is exhibited, at an elevation of 42 feet (12m8), from a red iron framework structure, 35 feet (10m7) in height, situated on the head of the breakwater; a fog signal is sounded from this light-structure.

A light is exhibited, at an elevation of 47 feet (14m3), from a white concrete structure, 41 feet (12m5) in height, situated on the head of No. 2 wharf.

Leading lights are exhibited on the root of No. 2 wharf. The front light is exhibited, at an elevation of 64 feet (19m5), from a white square iron structure, 58 feet (17m7) in height; the rear light is exhibited, at an elevation of 108 feet (32m9), from a similar structure, 101 feet (30m8) in height, situated about three-quarters of a cable north-westward of the front light. These lights are in line bearing 322°. Two leading beacons, each consisting of a white post surmounted by a

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Chart 3694.

triangle, are situated nearly one cable eastward of the rear leading light; these beacons are in line bearing 322°, and indicate the eastern side of the channel leading to No. 2 wharf.

A light-buoy, No. 5, painted black, exhibiting a *white occulting* light, is moored about 3 cables southward of the head of No. 1 wharf; this light-buoy, in conjunction with the four light-buoys in Hōhaku ku, described on page 556, indicates the channel, which is about three-quarters of a cable wide and has been dredged to a depth of about 30 feet (9m1), leading from Hōhaku ku to Kanseishi. A light-buoy, No. 6, painted red, exhibiting a *red flashing* light *every three seconds*, is moored nearly 2 cables south-eastward of the head of No. 2 wharf. A light-buoy, No. 7, painted black, exhibiting a *white group flashing* light, giving *three* flashes *every six seconds*, is moored about 1½ cables south-westward of the head of No. 2 wharf.

Shusui tō is the bay westward of No. 2 wharf, and is separated from Baka tō by Tokai tō; it is divided into two parts by Kō shi promontory, but both arms are mostly occupied by mud flats which dry. A reef, with several rocks on it, extends about one cable from Kō shi; foul ground extends as much as half a mile from the northern side of Shusui tō.

Ryūjūton ku.—Light.—Buoy.—Ryūjūton ku is the section of Dairen kō which lies northward of the northern limit of Hōhaku ku; it includes two bays, named Tensui tō and Ka tō, and is divided into three areas, as shown by pecked lines on chart 3694.

The coast between the root of Kanseishi breakwater and Rōryū tō (Kyu tō se ki), about 2 miles north-north-eastward, is fringed with reefs, rocks and shoals, which extend as much as 4 cables offshore; Kaibyō (Hai myo) tō, an islet 15 feet (4m6) high, lies on this shoal ground and about midway along this coast. A light is exhibited, at an elevation of 13 feet (4m0), from the head of an oil pier which extends from the coast nearly half a mile north-eastward of the root of Kanseishi breakwater.

Tensui (Ton sui) tō is entered between Rōryū tō and Menkatō kaku (Men kiva tō), about one mile north-eastward. Rōryū tō is a steep headland, 199 feet (60m7) high; Ryūtō seki, a rocky islet, lies on a reef which extends a short distance eastward from Rōryū tō. A spit, with depths of less than 3 fathoms (5m5) and several rocks on it, extends about 3 cables south-south-westward from Menkatō kaku. There are depths of from 2 to 3 fathoms (3m7 to 5m5) in the middle of Tensui tō, and it affords shelter to small vessels with northerly winds; there are three inner bays, but they all dry.

Ka tō is entered bewteen Menkatō kaku and Kōrōshi kaku (O Jo point), nearly 1½ miles eastward; there are depths of from 3 to 4 fathoms (5m5 to 7m3) in the entrance and in the middle part of the bay, and it is well sheltered from northerly winds. Ryūjūton village is situated on the eastern side of the bay, and is connected to the main railway system; two iron piers extend from the coast at this village, the longer of the two being about a cable in length. Three conspicuous wireless masts stand close eastward of the village. Daiheitan (Tai hei nan) san is a conspicuous sharp peak, 259 feet (78m9) high, situated about half a mile east-north-eastward of Kōrōshi kaku.

Kōrōshikō (Ko jo shi ye) seki, nearly half a mile south-south-eastward of Kōrōshi kaku, is a rock awash, with depths of less than 3

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Chart 3694.

fathoms (5m5) for about half a cable all round it; a red conical buoy, with a triangular topmark, is moored off the southern side of this rock.

Signals.—*Berthing signals.*—The following signals are made by flags of the International Code of Signals from No. 1 Signal station (*Lat. 38° 56′ N., Long. 121° 39′ E.*), situated on the head of No. 2 mole Futō ku:—

Signal.	*Signification.*
Numeral flag 1	Secure alongside No. 1 berth, Futō ku.
,, ,, 2	,, ,, No. 2 ,, ,, ,,
,, ,, 3	,, ,, No. 3 ,, ,, ,,

and so on, consecutively to No. 52 berth inclusive.

Numeral flags 99	Secure at Hamamachi pier.
Numeral flag 1 below a black ball. ..	Secure to No. 1 buoy Futō ku.
,, ,, 2 below a black ball. ..	Secure to No. 2 buoy Futō ku.
,, ,, 3 below a black ball. ..	Secure to No. 3 buoy Futō ku.
,, ,, 4 below a black ball. ..	Secure to No. 4 buoy Futō ku.
,, ,, 1 below a black cone. ..	Berth on the west side of Jijikō No. 1 pier.
,, ,, 2 below a black cone. ..	Berth on the east side of Jijikō No. 1 pier.
,, ,, 3 below a black cone. ..	Berth on the west side of Jijikō No. 2 pier.
,, ,, 4 below a black cone. ..	Berth on the east side of Jijikō No. 2 pier.
Answering pendant below flag A. ..	Anchor in Hōhaku ku.
One black cone below flag A. ..	Anchor in Jijikō ku.
One black ball below flag A. ..	Anchor in Futō ku.
Two black cones points together below flag A. ..	Anchor in Kanseishi ku.

The following signals are made by the International Code of Signals from No. 2 Signal station, situated at the root of Kanseishi No. 1 wharf:—

Signal.	*Signification.*
Numeral flag 1 below two black cones, points together.	Secure alongside No. 1 berth, Kanseishi No. 1 wharf.
,, ,, 2 below two black cones, points together.	Secure alongside No. 2 berth, Kanseishi No. 1 wharf.
,, ,, 3 below two black cones, points together.	Secure alongside No. 3 berth, Kanseishi No. 1 wharf.
,, ,, 4 below two black cones, points together.	Secure alongside No. 4 berth, Kanseishi No. 1 wharf.

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Signal.	*Signification.*
Numeral flag 5 below two black cones, points together.	Secure alongside No. 5 berth, Kanseishi No. 1 wharf.
,, ,, 6 below two black cones, points together.	Secure alongside Kanseishi No. 2 wharf.
,, ,, 7 below two black cones, points together.	Secure alongside Kanseishi oil wharf.

At night, the berthing signals are made by flashing lamp in the Morse code.

Storm signals.—General storm signals, local gale warning signals, and weather signals are displayed from Nos. 1 and 2 Signal stations; *see* pages 34 to 39. Barometric signals are also displayed from both Signal stations.

Tide signals.—Signals denoting the state of the tide are made from both Signal stations by means of a black cone hoisted between two yardarms. The cone point upwards indicates a rising tide, and point downwards a falling tide, and the various positions indicate the state of the tide as follows:—

Hoisted close up to the upper yardarm.	Top of high water or beginning of ebb.
Halfway between the yardarms	Half flood or half ebb tide.
At the bottom yardarm	Beginning of flood or end of ebb tide.

Barometric signals.—Barometer comparison signals are made from both Signal stations by the International Code of Signals to show the barometric pressure at 1000, as registered at the Kwantung Government Observatory; they are hoisted about 10 minutes after the observation has been made.

Harbour signals.—The following signals are made by flags of the International Code of Signals by vessels at Dairen kō:—

Flag B	I have explosives on board.
,, F	Ash-boat required.
,, W	Fresh water wanted.
,, Y	Tug or steam launch required.
,, T	I have a pilot on board.

Regulations.—The following are extracts from the Harbour regulations for Dairen kō:—

Article 4.—The anchorages for vessels are as follows:—

(*a*) The anchorage for vessels with explosives on board is in the vicinity of Jijikō piers Nos. 1 and 2.

(*b*) The quarantine anchorage is the area bounded by the following lines:

Western limit, from the light on the eastern end of the northern breakwater (*Lat. 38° 56′ N., Long. 121° 40′ E.*) to No. 3 lightbuoy of the Kanseishi fairway; northern limit, the line from No. 3 light-buoy to No. 1 light-buoy; eastern limit, the alignment of the two Jijikō leading lights; southern limit, the line drawn 110° from the light on the eastern end of the northern breakwater.

(*c*) The free anchorage for vessels is Hōhaku ku, except for the quarantine anchorage and Dairen and Kanseishi fairways, as laid down in Article 19.

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Chart 3694.

Article 5.—Except in unavoidable circumstances, vessels may not shift berth without the permission of the Chief of the Marine Bureau. If in accordance with the above circumstances vessels have shifted their berths, they must immediately report their reasons and new anchorage to the Chief of the Marine Bureau.

Article 6.—Vessels entering the port must hoist their national ensigns and names in the International Code of Signals by day, and at night exhibit the regulation lights, and keep them hoisted until they reach their berths, or when leaving the port from the time they leave their berths until outside the harbour.

Article 7.—Vessels wishing to proceed into any of the three areas of Ryūjuton ku must give previous notice to the Chief of the Marine Bureau.

Article 9.—Vessels arriving in Dairen kō from places outside Kwantung province must wait in the quarantine anchorage for medical inspection, and must hoist the quarantine signal before entering; when this inspection is difficult to carry out in the quarantine anchorage, it will be performed in a place appointed by the Chief of the Marine Bureau. *See* also Quarantine Regulations on page 49.

Article 10.—Vessels may not communicate with the shore or with other vessels, or land passengers, crew or cargo, until they have been inspected by an official of the Marine Bureau and received the permit for communication; the following papers must be handed in:—

(*a*) Report of arrival.
(*b*) Nominal list of passengers.
(*c*) Nominal list of crew.
(*d*) Manifest of the cargo.

Article 11.—Vessels plying solely on the coasts of Kwantung province should hand in a report of arrival immediately they have entered.

Article 14.—Within 24 hours of a vessel's arrival in port, she must send in to the Chief of the Marine Bureau a nominal list of the crew, a certificate of registry or corresponding document, and a clearance permit from her last port of departure. This, however, does not apply if she leaves within 24 hours of her arrival without landing any passengers or cargo.

Article 15.—Vessels may not leave the port unless they have handed in the following papers and received a permit to depart:—

(*a*) Request to depart.
(*b*) Nominal list of passengers.
(*c*) Outward cargo manifest.

Vessels must hoist the departure flag at the foremast 12 hours before sailing.

Article 16.—Vessels remaining at their berths for more than 24 hours after receiving the permit for departure may not leave the port without repeating the procedure of Article 15. This does not apply in cases where cargo has not been handled.

Article 17.—Vessels returning to port within 12 hours of departure owing to damage, for repairs or for any other reason, may furnish a statement of such reasons in writing to the Chief of the Marine Bureau instead of sending in the usual reports of arrival.

Article 18.—No cargo shall be loaded or unloaded, nor shall any

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passenger or crew land or embark, at places other than the following except with the permission of the Chief of the Marine Bureau :—

(*a*) The Jijikō piers and their vicinity in Jijikō ku.

(*b*) All the wharves in Futō ku.

(*c*) Kanseishi wharf (*Lat. 38° 58′ N., Long. 121° 38′ E.*) in Kanseishi ku.

(*d*) The shore of Ryūjūton ku, No. 2 area.

Dangerous articles may not be landed or embarked except at Jijikō piers Nos. 1 and 2 and their vicinity, unless permission has been obtained from the Chief of the Marine Bureau.

Article 19.—The fairways for vessels are fixed as follows :—

Dairen fairway.—Between the parallel lines drawn 110° for 4 miles from the light-structure on the eastern end of the northern breakwater of Futō ku and that on the head of the eastern breakwater, respectively ; also between the parallel lines drawn 280° for 4 cables from the same light-structure.

Kanseishi fairway.—Between the line from the light-structure on Kanseishi breakwater through No. 4 light-buoy to No. 2 light-buoy, and the line from No. 5 light-buoy through No. 3 light-buoy to No. 1 light-buoy.

Article 20.—Incoming vessels proceeding to Futō ku or to Kanseishi wharves must keep out of the way of outgoing vessels ; in the case of Dairen fairway they must keep off the fairway outside the breakwaters, and in the case of Kanseishi fairway they must keep outside the same fairway.

Vessels entering port must not secure or anchor elsewhere than as ordered by the special berthing signals made from either No. 1 or No. 2 signal station.

Article 22.—Unless vessels are proceeding to or leaving a wharf or pier, they must not stop within one cable of it.

Article 23.—Vessels passing through the eastern entrance to Futō ku must house their anchors as a precaution against damaging the submarine cable.

Article 31.—Vessels arriving in port with dangerous articles in excess of ordinary requirements must hoist at the foremast head or other conspicuous place a red flag by day and a *red* light at night ; they must wait in Hōhaku ku for instructions from the Chief of the Marine Bureau.

Article 39.—Vessels in the harbour must moor with two anchors, except when secured to the piers, quays, or mooring buoys. The chief of the Marine Bureau may waive this regulation if he considers it unnecessary.

Dairen.—The central part of the town of Dairen lies southward of Futō ku, and it extends eastward as far as Jijikō pier, and westward along the southern side of Baka tō ; mainly under the auspices of the South Manchurian Railway Company it has developed into a modern commercial and industrial town with all the usual facilities. In 1934 the population of Dairen was 444,686. A British Consular officer is stationed at Dairen.

A meteorological station stands on the summit of Wakusō san (*Lat. 38° 55′ N., Long. 121° 38′ E.*), a hill close southward of the central part of the town.

Trade and shipping.—The principal exports are coal, soya beans, bean cake and oil ; imports are timber, iron and steel, flour, etc.

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Chart 3694.

In 1929, 4,560 vessels with a total gross tonnage of 11,719,290 tons entered the port.

Harbour facilities.—A large stock of coal is maintained at Kanseishi; there are travelling electric transporters for loading the coal. The coaling berths in Futō ku are Nos. 1 to 4 at No. 1 mole, and 28 to 30 at No. 3 mole; coaling can also be carried out from lighters. Fuel oil can be taken in at Jijikō pier.

Provisions are plentiful; water is laid on to all the wharves, and can also be obtained from water boats.

There is a dry dock in the basin enclosed by Hamamachi pier (*see* Appendix I), and there is a small dock, used by coasting vessels of from 300 to 500 tons, on the eastern side of the artificial harbour in Rossia machi ku. Repairs of all descriptions can be undertaken.

Dairen is the terminus of the South Manchurian railway, which connects with the Trans-Siberian line; it also connects with the railway to Peiping and the Antung and Korea line. Numerous steamship lines provide regular communication with the principal ports in China, Japan and with Europe. There is a daily air service between Dairen, Mukden and Harbin, and there are also regular services to other places in Manchuria. Dairen is connected with the general telegraph system.

The hospital at Dairen, maintained by the South Manchurian Railway Company, is the largest and best equipped in Manchuria; it contains over 1,000 beds as well as private rooms.

COAST.—Rōkotan Ō (Rō Ko nada) or Cambrian cove is entered between Nan Zan shi (page 553) and Sei shi (Nishi point), nearly one mile westward, and affords good shelter with northerly winds in depths of from 4 to 7 fathoms (7^m3 to 12^m8). Foul ground, terminating in a rock awash, extends about a quarter of a mile south-westward from Nan Zan shi; between this rock and the point are Rōkoga, a rock 32 feet (9^m8) high, and an islet 45 feet (13^m7) high. A reef, with a rock on it which dries 10 feet (3^m0), extends about 2 cables from the eastern shore near the head of the bay. There is a storm signal station at Rōkotan, a small village at the head of the bay. The north-western part of the bay dries entirely; electric trams run from this part of the bay to Dairen.

A sand spit, with depths of less than 3 fathoms (5^m5), and terminating in a group of rocks which dry 4 feet (1^m2), extends about 4 cables from the coast and 1¾ miles westward of Sei shi. The coast between Sei shi and this sand spit consists mostly of steep hills and cliffs. The coast between this spit and Hokudaisan shi (North Oyama point), a conspicuous cliffy point about 2½ miles north-westward, is fringed by reefs and shoals which extend from one to 3 cables offshore. Higashi Dairen tō (East Dairen Jima) lies about 2 miles south-eastward of Hokudaisan shi and three-quarters of a mile offshore; Nishi Dairen tō (West Dairen Jima) lies on a shoal which extends about 4 cables north-westward from Higashi Dairen tō. A reef extends about 2 cables from the coast northward of these islets, and there are shoal depths between.

Chart 1798.

Off-lying islets and dangers.—Light.—Ni Tashi (Ni Da) is a flat-topped islet lying nearly one mile south-south-westward of Higashi

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Chart 1798.

Dairen tō ; several rocks lie about one cable off its north-eastern side, A rocky patch, with a depth of 3 fathoms (5m5) over it, lies about 4 cables north-eastward of Ni Tashi, and a small islet, 121 feet (36m9) high, lies about half a mile eastward of Ni Tashi (*Lat. 38° 50′ N., Long. 121° 36′ E.*).

Rohen tō, about 2¼ miles south-south-westward of Ni Tashi, rises precipitously on its western side to an elevation of 265 feet (80m8), and thence slopes down gradually to its eastern extremity. Shō tō (Ko Jima), a small islet 61 feet (18m6) high, lies about 2 cables south-eastward of Rohen tō. A submarine telegraph cable passes about one mile westward of Rohen tō, and two more cables pass between this islet and Ni Tashi ; all three cables are landed at Hoshi-ga-Ura.

A light is exhibited, at an elevation of 283 feet (86m3), from a white circular concrete structure, 25 feet (7m6) in height, situated on Rohen tō.

Coast.—Hoshi-ga-Ura, a summer resort and suburb of Dairen, is situated about one mile westward of Hokudaisan shi and at the western end of a sandy beach. The landing place of the three submarine telegraph cables which pass near Rohen tō is marked by two pairs of transit beacons. Dai san (Tai shan), a hill 627 feet (191m1) high, is situated nearly one mile north-north-eastward of the landing place of the cables, and Hitō san (Ai tō shan), 1,299 feet (395m9) high, is about 4½ miles westward of Dai san.

The coast between Hoshi-ga-Ura and Shōhei tō, about 4½ miles south-westward, forms several rocky headlands, and reefs extend as much as 4 cables offshore. Shōhei tō is a narrow, rocky peninsula, 261 feet (79m6) high, connected to the mainland by a low isthmus about half a mile long, on which is a village ; the south-east coast of the peninsula is cliffy. Shi tashi, an islet 150 feet (45m7) high, lies about 1¼ miles eastward of the north-eastern extremity of Shōhei tō and there is a group of three islets between, with depths of over 5 fathoms (9m1) both eastward and westward of the group ; a reef extends about a quarter of a mile north-westward from Dai Tashi (O da), the westernmost islet, and about the same distance northward from Ni Tashi, the next islet eastward. Tōkō (Tung ko), the bay on the north-eastern side of Shōhei tō, has depths of from 1¾ to 3¼ fathoms (3m2 to 5m9) in its outer part, but a reef, which dries 6 feet (1m8), lies in the middle of the entrance ; in 1934 a dock was under construction on the northern side of Shohei tō. Small vessels with local knowledge can anchor outside Tōkō and northward of the islets just described, which partially shelter them from the southward, in depths of from 5 to 7 fathoms (9m1 to 12m8).

Seikō (Si ko), the bay on the south-western side of Shōhei tō, has depths of from 2¾ to 6¼ fathoms (5m0 to 11m9) in its south-eastern part, and affords anchorage to small vessels with local knowledge ; shoals and rocks, one of which is 13 feet (4m0) high, extend nearly 4 cables from the northern shore of the bay. There is also anchorage, in a depth of about 16 fathoms (29m3), good holding ground, outside Seikō, with the south-western extremity of Shōhei tō bearing 106°, distant half a mile ; this anchorage is sheltered from winds between north-west and east, but the bottom is uneven.

Daikō tō (Tai ko peak) is situated about 3¼ miles westward of the south-western extremity of Shōhei tō, the coast between, except for

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Chart 1798.

the foul ground in Seikō, being fairly steep-to; a rock, which dries one foot (0m3), lies about one cable southward of Daikō tō. A cove, which forms the estuary of a small river, lies immediately westward of Daikō tō. Shō shi (Matsu point), 137 feet (41m8) high, is situated nearly 1¼ miles westward of Daikō tō, and is the western entrance point of another cove, which is also the estuary of a small river; a rock, 19 feet (5m8) high, lies close off the eastern entrance point. The village of Ryūōtō is situated on the western shore and about half a mile within Shō shi (*Lat. 38° 49′ N., Long. 121° 23′ E.*).

Between Shō shi and a point, 213 feet (64m9) high, about 3½ miles westward, is a bight with depths of from 6 to 8 fathoms (11m0 to 14m6) over the greater part, but rocks and shoals extend half a mile from its north-western shore; three streams flow into the bight, the largest being the Dai ka, which flows into the north-western corner.

Tidal streams.—For several miles off the coast between Dairen wan and Ryojun, the west-going stream runs from between 2½ hours and 3½ hours after low water until between 3½ hours and 4½ hours after high water; the east-going stream runs for the remainder of the time. The tidal streams are, however, very irregular off Ryojun, and in summer, during spring tides, the west-going stream has been observed to run for 9 hours during the daytime, and the east-going stream for 3 hours.

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RYOJUN KŌ.—Approach.—Dangers.—Light.—Beacons.— Chōhō shi (Kyoho point) is situated about three-quarters of a mile south-westward of the 213-foot (64m9) high point previously mentioned and has a beacon on it; some rocky patches, with depths of less than 3 fathoms (5m5) over them, extend about 3 cables south-eastward from Chōhō shi. The coast between Chōhō shi and Rōritsu shi, about 6 cables westward, is steep-to. About three-quarters of a mile westward of Rōritsu shi is a cliffy point, with a beacon on it, from which a reef, named Moshu shō, extends about 3 cables southward; the outer part of this reef dries 9 feet (2m7), and there is a beacon on its extremity.

Moshu gan or Lutin rock lies nearly a quarter of a mile south-westward of the beacon on Moshu shō and dries 9 feet (2m7). A light is exhibited, at an elevation of 38 feet (11m6), from a red circular concrete structure on Moshu gan; a fog bell is sounded from the light-structure. Moshu gan is covered by the *green* sector of Rōkobi light (page 568) between the bearings of 216° and 300°.

Rōtetsusan tōkaku (Rotetsu Zan), on the western side of the approach to Ryojun kō, is a cliffy point, with a beacon on it, situated about 6½ miles south-westward of Chōhō shi and nearly 7 cables eastward of Rōtetsusan seikaku lighthouse (*see* page 381); two white beacons, 24 feet (7m3) in height, are situated near the point, and in line, bearing 350°, indicate the course to Chefoo. Rōtetsu san, 1,512 feet (460m9) high, is situated about 1¼ miles north-westward of Rōtetsusan tōkaku, and ridges, intersected by ravines, run down from it to the coast.

Kaiyō shō, marked by a small white stone beacon, dries 8 feet (2m4), and is the outer rock of a ledge which extends about 3 cables eastward from a point situated about 1½ miles north-north-eastward of Rōtetsusan

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tōkaku. Jōtō shi, with a beacon on it, is situated about 1½ miles north-north-eastward of Kaiyō shi, the coast between being low and slightly indented. From Jōtō shi to the western entrance point of Ryojun kō, nearly 2 miles north-north-eastward, the coast is mainly cliffy, and is fringed by a reef, with depths of less than 3 fathoms (5^{m}5) from one to 2 cables offshore; behind this part of the coast are the hills Jōtō san, Mantō san (Manju yama), and Keikan san.

Chart 3763.

Outer anchorage.—There is open anchorage, in a depth of about 5½ fathoms (10^{m}1), from a half to three-quarters of a mile southward of the western entrance point of Ryojun kō; with winds from seaward, however, a heavy sea gets up, and boatwork is difficult.

Entrance channel.—Lights.—Buoys.—Beacons.—Ōgon (Ogan) san (*Lat. 38° 48′ N., Long. 121° 15′ E.*) rises to an elevation of 410 feet (125^{m}0) on the eastern entrance point of Ryojun kō, and has a conspicuous fort on its summit. Two pairs of beacons are situated near the coast westward of Ōgon san and on the eastern side of the channel. There are two pairs of small beacons at the northern end of the eastern side of the entrance channel.

Rōkobi san is a hillock on the western entrance point of Ryojun kō, and there is a signal station on its summit. Rōkobi is a narrow tongue of land which extends about 4 cables northward from Rōkobi san and forms the western side of the entrance channel.

A light is exhibited, at an elevation of 101 feet (30^{m}8), from a white circular concrete structure, 26 feet (7^{m}9) in height, situated on the bluff on the western side of the entrance to Ryojun kō. Two beacons with triangular topmarks stand close together a short distance eastward of this light-structure, and there are several other beacons on Rōkobi.

The fairway of the entrance channel to Ryojun kō is narrowed to about one cable by shoals which extend from either side. Two red pyramidal stone beacons, from each of which a light is exhibited, stand on the northern side of the harbour; the front beacon, 30 feet (9^{m}1) in height, is situated about 2½ cables north-north-eastward of the northern extremity of Rōkobi, and the rear becaon, 15 feet (4^{m}6) in height, is about half a cable northward of the front beacon. The front light is exhibited at an elevation of 111 feet (33^{m}8), and the rear light at an elevation of 147 feet (33^{m}8). These lights in line, bearing 356°, lead through the fairway of the entrance channel.

The southern end of the entrance channel is marked by a red buoy No. 6, on the eastern side, and a black buoy No. 3, on the western side; a red buoy No. 4 is moored about half-way along the eastern side of the fairway, and a light-buoy, No. 1, painted red and white in horizontal bands, exhibiting a *white fixed* light, is moored about half a cable eastward of the northern extremity of Rōkobi.

The least depth on the leading line, close southward of No. 3 buoy, is 28 feet (8^{m}5), but the depths increase farther in.

Harbour.—Lights.—Ryojun kō or Port Arthur is an open port, No. 1 area only, situated in the eastern part, being reserved for the Imperial Japanese Navy. The port has not been developed to any great extent since the Japanese occupation as Dairen, owing to its geographic position, has more advantages.

Hakugyoku san is a hill, with a mausoleum on its summit, situated

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Chart 3763.

on the northern side of the harbour and nearly three-quarters of a mile northward of the northern extremity of Rōkobi. Hyochu tō, about 1¾ cables southward of the mausoleum, is a circular tower, 250 feet (76m2) in height, surmounted by a projectile made of cement, and is erected to the memory of the 20,000 Japanese who lost their lives in the attack on Ryojun; nine electric lights are exhibited from the tower, at an elevation of 581 feet (177m1), and are visible from a distance of about 15 miles seaward.

Tō kō is a basin in the eastern part of Ryojun kō and forms No. 1 Area; it has depths of from 26 to 29 feet (7m9 to 8m8) almost throughout. There is a dry dock (*see* Appendix I.) on the northern side of Tō kō, and a small dock and a patent slip on the eastern side. Two vessels can berth alongside the western half of the north wall of the basin. A light is exhibited from an iron tower on each side of the entrance to Tō kō.

A submarine telephone cable crosses the harbour from the northern end of Rōkobi to the northern side of the entrance to Tō kō; its landing places are marked by beacons.

There is a small bay on the northern shore of the harbour and immediately northward of the entrance. The Customs' mole extends in a north-westerly direction from the eastern side of this bay, and a pier extends from the northern side; the basin thus enclosed is suitable for small craft, and the Harbour office is situated here. A light is exhibited, at an elevation of 15 feet (4m6), from a post on the head of the Customs' mole (*Lat. 38° 48′ N., Long. 121° 15′ E.*).

Nishi kō is a large area on the western side of Rōkobi, but the greater part of it is occupied by mud flats; close westward of Rōkobi there is an area, about three-quarters of a mile long in an north and south direction and about 2 cables wide, with depths of from 16 to 30 feet (4m9 to 9m1), in the northern part of which are three mooring buoys. On the northern side of Nishi kō and a short distance within the entrance, is Mantetsu pier, constructed by the South Manchurian Railway Company, which has a berthage length of about three-quarters of a cable, with a depth of about 26 feet (7m9) alongside, and available for a vessel of 6,000 tons; the land immediately westward of this wharf has been reclaimed to provide further berths, and is known as Mantetsu quay.

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Ryojun kō is divided into three areas: No. 1 Area comprises the whole of Tō kō; No. 2 Area comprises the entrance channel and the portion outside as far seaward as a line joining the beacon on Jōtō shi to a beacon on the coast northward of Moju shō; No. 3 Area is between the latter line and a line from the beacon on Rōtetsusan tōkaku to the beacon on Chōhō shi, and also includes Nishi kō.

Chart 3763.

Traffic signals.—The following signals are made by flags of the International Code of Signals at the signal stations on Rōkobi san:—

Signal.	*Signification.*
Flag A below a black ball ..	..A vessel has been directed either to enter or leave the harbour or to shift berth; other vessels are not to pass either inwards or outwards through the entrance channel whilst this signal is flying.

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Chart 3763.

Signal.	*Signification.*
Flag B below a black ball	..Secure at No. 1 berth, Mantetsu pier.
Flag C ,, ,, ,,	..Secure at No. 2 berth, Mantetsu pier.
Flag D ,, ,, ,,	..Secure at No. 3 berth, Mantetsu quay.
Flag E ,, ,, ,,	..Secure at No. 4 berth, Mantetsu quay.
Flag F below a black cylinder	..Anchor as convenient in the southern part of Nishi kō.
Flag G ,, ,, ,,	..Anchor as convenient in the central part of Nishi kō.
Flag H ,, ,, ,,	..Anchor as convenient in the north-western part of Nishi kō, leaving the fairway clear for vessels making for or leaving the pier or quay.
Flag I ,, ,, ,,	..The berth previously arranged is obstructed; anchor temporarily at the quarantine anchorage, and await directions.
Flag J ,, ,, ,,	..A berth is not available; anchor at the quarantine anchorage, avoiding the fairway.
Flag K ,, ,, ,,	..Proceed into Tō kō, but you must take up the position shown by the Ryōjun branch of the Dairen Steamship Company's dock factory.
Flag L ,, ,, ,,	..Proceed out of harbour.
Flag M ,, ,, ,,	..At present the passage through the entrance channel is not clear owing to another vessel arriving or departing; remain where you are until a further signal is made.
Flag N ,, ,, ,,	..Cancel the last signal and look out for the signal about to be hoisted.

The vessel receiving any of the above signals is to reply by hoisting the answering flag.

As vessels in the harbour are unable on most occasions to see the movements of other vessels, those leaving or entering the harbour, even after receiving the signal directing them to do so, must keep a constant lookout for signals made from the signal station on Rōkobi san (*Lat. 38° 48′ N., Long. 121° 15′ E.*) until the operation of leaving or entering is completed, bearing in mind that urgent signals may be made.

At night these special signals will be made by flashing lamp in the Morse code.

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Regulations.—Ryōjun kō is a minor Naval station; for Regulations for Japanese Naval Ports, *see* page 46. The following are extracts from the harbour regulations for Ryōjun kō:—

Article 2.—There is unrestricted anchorage in any part of No. 3 Area except Nishi kō. Nishi kō, with the quay and pier, are the anchor-

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Charts 3763, 1798.

age or the securing berths for vessels. The quarantine anchorage is eastward of the line drawn 185° from Rōkobi lighthouse and in the free anchorage of No. 3 Area.

Article 3.—Vessels wishing to anchor in any part of the port except the free anchorage must obtain instructions from the Chief of the Marine Bureau; small craft may, however, anchor without waiting for these instructions provided that they do not obstruct the fairway or impede navigation.

Article 5.—Within the port vessels may not shift berth without the permission of the Chief of the Marine Bureau; this does not apply in cases of bad weather, fire or other unavoidable circumstances. If, in accordance with any of these circumstances, vessels have shifted their berths, they must immediately report their reasons and new berth to the Chief of the Marine Bureau.

Article 6.—Vessels entering the port must hoist their National ensigns and names in the International Code of Signals, and at night exhibit the regulation lights, and keep them hoisted until they reach their berths, or when leaving the port from the time they leave their berths until outside the harbour.

Article 7.—Vessels arriving at the port from places outside Kwantung province must undergo quarantine examination, and must hoist the quarantine signal before entering.

Article 8.—Vessels to which the previous Article applies must anchor in the quarantine anchorage, and must hold no communication with the shore or with other vessels, nor may passengers, crew or any article be landed, until permission has been obtained. *See* also Quarantine Regulations on page 49.

Article 9.—Vessels plying solely on the coasts of Kwantung province should hand in a report of arrival immediately they have entered.

Article 10.—Vessels of 1,000 tons or over may not pass through the entrance channel without a pilot, unless permission has been obtained from the Chief of the Marine Bureau. If the latter deems it necessary, vessels of under 1,000 tons must employ a pilot.

Article 13.—Within 24 hours of a vessel's arrival in port, she must send in to the Marine Bureau a nominal list of the crew, a certificate of registry or corresponding document, and a clearance permit from her last port of departure. This, however, does not apply if she leaves within 24 hours of her arrival without landing any passengers or cargo.

Article 14.—Vessels must report their intending departure one hour before the time for leaving, and they may not leave the port unless they have received permission to do so. Vessels must hoist the departure flag 12 hours before sailing.

Article 15.—Vessels which remain at anchor for more than 24 hours after receiving the permit for departure may not leave port without repeating the procedure of Articles 13 and 14. This does not apply in cases where cargo has not been handled.

Article 16.—Vessels returning to port within 12 hours of departure owing to damage, for repairs, or for any other reason, may furnish a statement of such reasons in writing to the Chief of the Marine Bureau instead of sending in the usual report of arrival.

Article 18.—The fairway through the entrance channel to Ryōjun kō is within half a cable on either side of the alignment of the leading

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Charts 3763, 1798.

beacons on the lower slope of Hakugyoku san (*Lat. 38° 49′ N., Long. 121° 15′ E.*); this fairway extends 2¾ cables northward from No. 3 buoy.

Article 19.—If an entering vessel is outside the entrance channel she must give way to a departing vessel. Vessels in the entrance channel or in the fairway must not unnecessarily stop, anchor, cast off a tow, or do anything to obstruct the fairway; sailing vessels must not tack in the channel.

Article 38.—Vessels in the harbour must moor with two anchors, except when secured to the pier, quay, or a mooring buoy.

Article 39.—A vessel at anchor in the harbour must not attach a buoy to her anchor.

Article 42.—Vessels under way in the harbour must only proceed at a speed sufficient for steerage way. They must not proceed abreast one another, and in the entrance channel they must not cross the bows of or overtake another vessel.

Article 49.—No rubbish, ashes, or oil waste or similar substance may be thrown into the water or on the shore of No. 2 Area or in Nishi kō. Oil waste may be discharged in No. 3 Area, except in Nishi kō. If a lighter is required for the disposal of rubbish or ashes, flags F T of the International Code of Signals or a blue flag must be hoisted.

Chart 3763.

Town of Ryojun.—The town of Ryojun is situated on the northern side of the port, and is divided into two parts by Hakugyoku san. The Old town is the eastern part, and contains the office of the Marine Bureau, Defence Force headquarters, Civil Administration office, offices of the Dock Company, Post Office, and Naval clubs; the New town, on the north-western side of Nishi kō contains the Government offices, Military and Police headquarters, Military club, and Telegraph office. In 1934 the total population was 141,291.

Harbour facilities.—Provisions are obtainable. The quantity of coal in stock varies, and it is usually obtained from Dairen; fuel oil can be obtained.

There is a hospital in the Old town.

Ryojun is the terminus of the branch of the South Manchurian Railway from Dairen. There are no regular steamship services. Ryojun is connected with the general telegraphic system, and there is a telephone service.

General storm signals are exhibited at the root of the pier (*Lat. 38° 48′ N., Long. 121° 15′ E.*) in the small bay immediately northward of the entrance to Ryojun kō; *see* page 34.

Trade and shipping.—The principal exports are coal, selisa, limestone, granite, and salt.

In 1927, 172 steam vessels with an aggregate of 360,338 tons entered the port.

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Particulars of Dry Docks, Patent Slips, &c.

NAME OF PORT AND DOCK	Length from Bilge of Caisson or Mitre Post of Gates at		Breadth of Entrance at		‡ Distance {below (+) above (—)} Chart Datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
						Blocks at			Maximum Depth over Blocks		Lifting Power	
	Coping Head (1)*	Floor Head (2)*	Coping (3)†	MHWS level (4)†	Sill (5)	Entrance (6)	Head (7)	(8)	Forward (9)	Aft (10)	(11)	(12)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
AMOY:												
Government dry dock	360	340	59½	40	—	—4½	—	16½	—	—	—	
MA WEI ANCHORAGE:												
Government dry dock	370	318	70	—	+2½	—	—	17½	—	—	—	
BAKŌ KŌ:												
Government dry dock	328	285	—	80	+7½	+6½	—	10½	—	—	—	Japanese naval port
KIRUN KŌ:												
Dry dock . .	372	344	48	—	+10½	+11	—	4	—	—	—	A vessel 300 ft. in length, with a draught of 14 ft., has been docked.
SHANGHAI:												
Cosmopolitan dry dock	—	650	77	—	+16	+12½	—	10½	—	—	—	
TSING TAO:												
Dry dock . .	515	480	75	—	+15½	+12	—	12½	—	—	—	Takes vessels up to 474 ft. in length.

* In the case of Floating Docks, Patent Slips, &c., Column (1)=Extreme Length. Column (2) Length on Blocks or Cradle.
† In the case of Floating Docks, Column (3)=Breadth at Top. Column (4)=Breadth at bottom of Dock.
‡ In order to find the depths on Sill, &c., the quantities in columns (5), (6) and (7), should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

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PARTICULARS OF DRY DOCKS, PATENT SLIPS, &c.—*continued.*

NAME OF PORT AND DOCK	Length from Bilge of Caisson or Mitre Post of Gates at		Breadth of Entrance at		‡ Distance {below (+) / above (−)} Chart Datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping Head	Floor Head	Coping	MHWS level	Sill	Blocks at			Maximum Depth over Blocks		Lifting Power	
						Entrance	Head		Forward	Aft		
	(1)*	(2)*	(3)†	(4)†	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
TIENTSIN: At Tangku, dry dock.	600	532	50	—	+ ½	—	—	9½	—	—	—	
DAIREN KÔ: Dry dock . .	443	396	57½	56	+10½	+9½	—	9½	—	—	—	
RYOJUN KÔ: Dry dock . .	535	534	97½	83½	+27	+25½	—	8½	—	—	—	Under the control of the Japanese Navy.

* In the case of Floating Docks, Patent Slips, &c., Column (1) = Extreme Length. Column (2) Length on Blocks or Cradle.
† In the case of Floating Docks, Column (3) = Breadth at Top. Column (4) = Breadth at bottom of Dock.
‡ In order to find the depths on Sill, &c., the quantities in columns (5), (6) and (7), should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

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APPENDIX II.

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS OF DEPTHS, &c.

PORT	Depth below Chart datum level		Rise of Tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
			Feet	Feet	
SWATOW . .	11 feet on bar (in 1937)	5 to 7 fms.	About 8	About 7	
AMOY:					
Outer harbour	About 7 fms.	7 to 12 fms.	—	—	
Inner harbour	5 to 8 fms.	4½ to 16 fms.	16½	13½	Vessels berth at mooring buoys.
BAKŌ KŌ . .	5 to 12 fms.	5½ to 8 fms.	10½	7½	Japanese Naval Port.
MA WEI ANCHORAGE:					
Outer bar .	14 feet ..	Available for all vessels that can cross the bar	17½	14½	
Inner bar .	10½ feet ..				
TAKAO KŌ . .	4 fms. ..	3½ to 4½ fms.	3½	2	Quays and mooring buoys.
KIRUN KŌ:					
Outer harbour	Deep ..	7 to 9 fms.	6	4½	
Inner harbour	36 feet ..	30 to 36 feet	—	—	Quays and mooring buoys.
PORT OF SAN-TU-AO .	Deep ..	8 to 10 fms.	25	20	
SHANGHAI .	About 3½ fms.	4 to 8 fms.	16	11	
KIAOCHOW BAY:					
Outer harbour	Deep ..	3 to 10 fms.			
Inner harbour		3 to 8 fms.	12½	9½	Depths of 21 to 28 feet alongside wharves in Commercial harbour.

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LIST OF PRINCIPAL PORTS, ETC.—*continued.*

PORT	Depth below Chart datum level		Rise of Tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
			Feet	Feet	
WEIHAIWEI:					
Eastern entrance	20 feet ..	From 20 feet upwards	6½	5½	
Western entrance . .	Deep ..		—	—	
CHEFOO:					
Southern entrance . .	4½ fms. ..	2½ to 9 fms. in outer harbour	8	6½	Depths of from 10 to 25 feet in inner harbour.
Northern entrance . .	6 to 9 fms. ..		—	—	
TIENTSIN . .	16½ feet on Taku bar (in 1936)	24 feet in Taku road	9½	8½	Vessels with a draught of about 13 feet can reach Tientsin.
CHINWANGTAO .	24 feet ..	20 to 30 feet alongside quays	5½	—	
YINGKOW . .	9 feet ..	12 to 29 feet	10½	7½	
CHEMULPHO .	6 fms. ..	6½ fms.	28½	21½	Depth of about 28 feet in tidal basin in inner harbour.
CHINNANPO .	6 to 12 fms.	7 to 15 fms.	18	14	Depth of about 20 feet alongside quays in basin.
DAIREN KŌ .	4 to 7 fms.	24 to 35 feet in artificial harbour	9½	8½	
RYOJUN KŌ	28 feet ..	21 to 38 feet	8½	7	Japanese Naval Port.

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APPENDIX III.

PLACE—AMOY. LAT. 24° 26′ N. LONG. 118° 04′ E. *Height above Mean Sea Level*, 16 *feet*

METEOROLOGICAL TABLE COMPILED FROM 6-45 YEARS' OBSERVATIONS. 1880-1934

MONTH	PRESSURE At Mean Sea Level		AIR TEMPERATURE							Relative Humidity	Cloud Amount Scale 0 to 10	RAIN			WIND‡								No of Days with Gales	No. of Days with Fogs
	Mean		Average.	Mean (of)		Mean (of)		Extreme				Average Fall	No. of Days	Max. Fall in 24 hrs. †	Percentage of Observations from									
	For Month §	Daily Amplitude	‡	Daily Max.	Daily Min.	Highest in each month	Lowest in each month	Highest recorded	Lowest recorded						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.										
January	1021	—	58	62	52	72	43	80	20	76	5·9	1·3	7	0·9	5	47	16	9	4	6	5	2	6	0·3	0·9
February	1020	—	56	61	52	72	44	79	30	80	7·2	3·0	11	1·4	5	42	15	12	5	6	5	3	7	0·5	3
March	1018	—	60	65	55	77	47	82	43	80	7·8	3·5	11	3·1	4	39	14	19	7	5	3	2	7	0·4	4
April	1013	—	67	72	63	82	53	86	49	82	8·2	4·9	12	8·9	3	28	12	25	11	7	3	2	9	0	3
May	1009	—	74	79	71	87	63	90	57	82	8·2	6·2	13	5·5	3	27	13	27	11	7	4	1	7	0	1·5
June	1006	—	81	85	77	91	68	94	61	82	7·6	7·0	14	4·6	2	16	7	22	24	17	4	2	6	0	0·2
July	1005	—	84	89	80	95	75	97	62	78	6·5	5·2	10	6·1	2	8	5	32	22	16	6	2	7	0·5	0·1
August	1004	—	84	89	80	94	76	100	73	78	6·4	6·6	11	6·7	4	14	7	26	16	17	7	2	7	0·2	0
September	1009	—	82	87	78	93	72	97	65	72	5·7	4·3	7	5·2	6	37	13	15	7	6	5	5	6	0·1	0·1
October	1014	—	77	82	71	89	63	95	56	71	6·2	1·9	4	1·2	10	53	16	7	2	2	3	4	3	0·7	0·1
November	1018	—	69	74	64	82	55	86	44	74	7·1	1·2	4	2·2	11	50	15	6	2	4	4	3	5	0	0·1
December	1020	—	62	68	57	76	47	82	41	74	6·6	1·3	5	1·8	8	45	17	10	2	5	6	3	4	0·4	0·5
Means	1013	—	71	76	67	95*	42**	—	—	77	6·9	—	—	—	5	34	13	17	9	8	5	3	6	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	46·4	108	—	—	—	—	—	—	—	—	—	—	3	13
Extreme Values	—	—	—	—	—	—	—	100	39	—	—	—	—	8·9	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	15	—	25	12-13		18-19				14	6	45	45	13-14	21-22									13	13

Hours of observation 0900.

§Reduced to mean of 24 hours.

‡ Tri-hourly observations.

†Maximum Fall during the 24 hours from one morning observation to the next.

*Mean of highest each year.

**Mean of lowest each year.

Authorities:—Nanking, Meteorological Report.
Zi-ka-wei, La pluie en Chine, by P. E. Gherzi, Shanghai, 1929.

Meteorological Office, Air Ministry.

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PLACE—TAIHOKU. LAT. 25° 02′ N. LONG. 121° 31′ E. *Height above Mean Sea Level, 30 feet.*

METEOROLOGICAL TABLE COMPILED FROM 24-37 YEARS OBSERVATIONS, 1897-1933.

MONTH	PRESSURE At Mean Sea Level		AIR TEMPERATURE							Relative Humidity	Cloud Amount Scale 0 to 10	RAIN			WIND									§ No. of Days with Gales	No. of Days with Fogs
	Mean		Average	Mean (of)		Mean (of)		Extreme				Average Fall	No. of Days ‡	Max. Fall in 24 hrs. †	Percentage of Observations, from										
	For Month	Daily Amplitude		Daily Max.	Daily Min.	Highest in each month	Lowest in each month	Highest recorded	Lowest recorded						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1021	3·1	59	66	54	80	44	86	37	84	7·8	3·4	16	2·5	3	15	52	5	3	4	5	8	5	0·4	2
February	1020	2·9	59	65	53	80	44	88	32	84	8·2	5·3	17	2·3	2	17	48	5	3	4	6	10	5	0·4	1·5
March	1018	2·8	62	70	57	85	48	91	35	84	8·0	7·0	17	2·8	4	17	45	4	3	4	6	12	5	1	1·5
April	1014	2·5	69	77	63	90	53	85	46	83	7·7	6·7	15	6·9	5	17	43	5	3	3	7	12	5	0·9	0·9
May	1010	2·1	75	83	69	92	61	98	50	82	7·5	9·1	16	6·7	4	16	42	8	4	3	7	10	6	0·5	0·8
June	1007	1·9	80	89	73	95	67	99	60	81	7·4	11·4	15	7·8	5	10	22	13	9	8	15	10	8	0·5	1
July	1006	1·9	83	92	76	96	72	101	67	78	5·9	9·1	14	14·1	6	9	20	16	10	10	13	11	5	1	0·5
August	1005	2·0	82	91	75	96	71	100	66	78	5·9	12·0	15	11·3	4	11	25	17	10	8	10	10	5	2	0·4
September	1009	2·2	79	88	73	94	66	97	56	80	5·8	9·6	14	9·1	4	21	39	11	6	4	4	7	4	0·9	0·4
October	1015	2·5	73	81	67	91	59	95	51	81	6·8	4·8	15	7·8	2	22	57	6	3	1	2	4	3	0·7	0·5
November	1019	2·7	68	75	62	87	50	92	34	81	7·3	2·6	15	2·2	2	21	61	4	2	1	2	4	3	0·7	1
December	1021	3·0	62	69	57	82	46	88	35	83	7·6	2·8	16	3·1	2	19	59	4	2	2	3	5	4	0·3	1·5
Means	1014	2·5	71	79	65	97*	41**	—	—	82	7·2	—	—	—	4	16	42	8	5	5	7	8	5	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	83·8	185	—	—	—	—	—	—	—	—	—	—	9	12
Extreme Values	—	—	—	—	—	—	—	101	32	—	—	—	—	14·1	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	37	24	37												24									37	37

Hourly observations. ‡Day with trace or more rain. §19 knots or over.

†Maximum Fall during the 24 hours from one morning observation to the next. *Mean of highest each year. **Mean of lowest each year.

Authorities:—MS. data supplied by Meteorological Observatory, Taihoku, Formosa.

Meteorological Office, Air Ministry.

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PLACE—KIRUN. LAT. 25° 09′ N. LONG. 121° 45′ E. *Height above Mean Sea Level* 105 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 21—34 YEARS' OBSERVATIONS, 1900—1933.

MONTH	PRESSURE At Mean Sea Level		AIR TEMPERATURE							Relative Humidity	Cloud Amount Scale 0 to 10	RAIN			WIND								No. of Days with Gales§	No. of Days with Fogs
	Mean		Average	Mean (of)		Mean (of)		Extreme				Average Fall	No. of Days ‡	Max. Fall in 24 hrs. †	Percentage of Observations, from									
	For Month	Daily Amplitude		Daily Max.	Daily Min.	Highest in each month	Lowest in each month	Highest recorded	Lowest recorded						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W	Calm.		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1021	2·7	60	65	56	77	47	85	41	85	8·6	11·7	22	3·9	29	30	13	4	7	8	2	6	1	3	1
February	1020	2·5	59	64	55	78	47	87	37	85	8·7	11·3	21	3·6	28	26	12	5	7	9	3	8	2	2	1
March	1018	2·4	62	67	57	80	49	91	46	86	8·6	12·0	21	3·6	25	25	13	5	8	9	3	10	2	2	2
April	1014	1·9	68	74	63	86	55	94	49	85	8·0	8·4	18	4·6	22	22	14	6	10	11	4	7	4	0·8	1·5
May	1011	1·9	74	80	69	90	62	96	54	85	7·8	10·8	19	9·3	14	21	18	8	13	13	3	5	5	0·5	0·5
June	1007	1·3	79	86	74	94	67	98	62	83	7·3	9·2	15	5·7	10	12	14	7	18	24	5	6	4	0·8	0·5
July	1006	1·5	82	90	76	95	73	100	70	80	5·6	5·4	10	13·0	9	9	14	12	19	22	6	5	4	3	0·3
August	1005	1·6	82	89	76	95	73	100	68	80	5·6	6·9	12	10·4	9	10	17	12	18	20	5	5	4	2	0·3
September	1009	1·6	79	86	74	93	69	98	60	81	6·4	9·5	15	11·5	16	22	21	10	11	9	2	5	4	3	0·3
October	1015	2·0	74	79	69	88	63	100	58	81	7·8	9·5	18	6·6	19	37	20	7	6	4	1	3	3	2	0·3
November	1019	2·3	68	73	64	84	56	92	41	81	8·3	9·1	20	5·4	22	37	20	6	5	4	1	3	2	3	0·7
December	1021	2·4	63	68	59	77	50	85	43	83	8·6	11·0	22	6·0	24	33	17	6	6	6	1	5	2	2	0·6
Means	1014	2·0	71	77	66	95*	45**	—	—	83	7·6	—	—	—	19	24	16	7	11	12	3	6	3	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	114·8	213	—	—	—	—	—	—	—	—	—	—	24	9
Extreme Values	—	—	—	—	—	—	—	100	37	—	—	—	—	13·0	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	34	21	34												21									34	34

Hourly observations.

‡Day with trace or more rain.

§19 knots or over.

†Maximum Fall during the 24 hours from one morning observation to the next.

*Mean of highest each year.

**Mean of lowest each year.

Authorities:—MS. data supplied by Meteorological Observatory, Taihoku, Formosa.

Meteorological Office, Air Ministry.

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PLACE—TA CHI SHAN. LAT. 30° 49′ N. LONG. 122° 10′ E. *Height above Mean Sea Level, 247 feet.*

METEOROLOGICAL TABLE COMPILED FROM 5-40 YEARS' OBSERVATIONS.

MONTH	PRESSURE At Mean Sea Level		AIR TEMPERATURE							¶ Relative Humidity	Cloud Amount Scale 0 to 10	RAIN			WIND††									No. of Days with Gales.	No. of Days with Fogs.
	Mean		‡ Average	Mean (of)		Mean (of)		Extreme				Average Fall	No. of Days.	Max. Fall in 24 hrs. †	Percentage of Observations, from										
	For Month §	Daily Amplitude		Daily Max.	Daily Min.	Highest in each month	Lowest in each month	Highest recorded	Lowest recorded		††				N.	N.E.	E.	S.E	S.	S.W.	W.	N.W.	Calm		
	mb.	mb	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1029	—	40	44	38	56	25	63	13	82	6·7	1·9	6	1·2	37	11	5	8	5	3	3	28	0	0·3	7
February	1025	—	39	44	37	54	29	65	20	82	5·7	2·4	7	1·1	36	16	7	10	6	3	2	20	0	0·2	8
March	1022	—	45	49	43	63	35	70	23	78	6·1	3·7	10	2·1	25	15	8	19	11	4	3	14	1	0·5	8
April	1016	—	53	58	50	69	43	76	37	81	6·5	3·8	9	1·2	18	15	8	28	16	4	2	9	0	0	9
May	1013	—	62	67	59	77	53	82	46	83	6·7	3·3	8	1·5	9	16	14	38	12	3	2	5	1	0	12
June	1007	—	71	75	68	83	61	88	54	86	7·4	5·6	9	3·0	6	12	13	38	16	7	2	5	1	0·2	12
July	1006	—	78	83	75	87	69	94	62	85	5·7	3·6	5	1·8	2	8	8	46	26	5	2	2	1	0·7	3
August	1006	—	80	85	77	91	73	97	64	84	5·5	2·6	5	2·6	7	14	13	35	15	6	2	6	2	0·7	1
September	1013	—	75	79	71	86	64	92	55	77	6·9	3·9	7	3·5	21	30	13	19	4	2	1	9	1	1	0·3
October	1020	—	66	71	63	79	54	88	47	75	5·4	2·9	6	2·1	35	28	8	8	2	2	2	14	1	0·3	1
November	1024	—	55	60	52	71	42	76	24	72	5·7	1·8	5	1·5	27	18	7	12	6	4	3	22	1	0·8	3
December	1025	—	45	49	42	63	30	67	22	76	6·3	1·4	5	1·0	29	12	5	12	5	2	1	34	0	1	5
Means	1017	—	59	64	56	91*	23**	—	—	80	6·2	—	—	—	21	16	9	23	10	4	2	14	1	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	36·9	82	—	—	—	—	—	—	—	—	—	—	6	69
Extreme Values	—	—	—	—	—	—	—	97	13	—	—	—	—	3·5	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	5	—	25			15	15	40	40	5	6	39	39	6	6										

§Observations at 0900. ‡Corrected to mean of 24 hours. ¶Observations at 0900 and 1500. ††Tri-hourly observations.
†Maximum Fall during the 24 hours from one morning observation to the next. *Mean of highest each year. **Mean of lowest each year.

Authorities :—Nanking, Meteorological Report.
Zi-ka-wei. La température en Chine, by H. Gauthier, Shanghai, 1920.

Meteorological Office, Air Ministry.

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PLACE—ZIKAWEI LAT. 31° 12′ N. LONG. 121° 26′ E. *Height above Mean Sea Level, 23 feet.*

METEOROLOGICAL TABLE COMPILED FROM 11-62 YEARS' OBSERVATIONS, 1873–1934

MONTH.	PRESSURE At Mean Sea Level.		AIR TEMPERATURE.							Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN.			WIND.									No. of Days with Gales§	No. of Days with Fogs.
	Mean.		Average	Mean (of)		Mean (of)		Extreme.				Average Fall.	No. of Days ‡	Max. Fall in 24 hrs. †	Percentage of Observations, from										
	For Month	Daily Amplitude.		Daily Max.	Daily Min.	Highest in each month.	Lowest in each month.	Highest recorded.	Lowest recorded.						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1027	2·8	38	46	33	62	19	74	10	78	6·1	1·9	10	2·2	26	14	9	8	4	3	8	27	1	0·2	2
February	1025	2·6	39	47	34	63	23	83	17	78	6·8	2·3	10	1·4	24	16	14	10	4	3	7	20	2	0·3	2
March	1021	2·6	46	55	40	75	28	86	21	78	6·8	3·3	12	1·9	18	15	17	20	6	3	5	14	2	0·3	2
April	1016	2·4	56	66	50	84	37	93	30	79	6·9	3·7	13	2·2	13	13	18	26	8	3	7	10	2	0	3
May	1011	2·1	66	77	59	89	47	96	37	79	7·0	3·7	12	3·5	10	9	15	34	11	5	7	7	2	0	3
June	1006	1·7	73	82	67	95	58	103	51	84	7·6	7·1	14	5·3	6	8	21	34	14	6	5	4	2	0	3
July	1005	1·8	81	90	74	98	67	104	61	84	6·3	5·8	11	4·4	5	6	16	33	22	8	4	4	2	0	1
August	1006	1·8	81	90	74	97	67	104	61	84	5·8	5·6	11	6·8	9	9	19	31	12	6	5	6	3	0·9	0·9
September	1012	2·0	73	82	66	92	56	100	44	83	6·4	5·1	12	7·7	22	21	18	13	4	1	4	15	2	0·1	0·6
October	1019	2·3	63	74	57	84	42	92	34	79	5·7	2·8	9	7·9	24	22	18	9	3	2	5	16	1	0	2
November	1024	2·4	52	63	45	75	30	86	23	77	5·2	2·0	8	2·9	22	16	13	10	4	3	8	23	1	0·2	3
December	1026	2·8	42	53	36	66	22	75	14	76	5·1	1·4	8	1·6	20	12	8	10	5	4	9	30	2	0·2	2
Means	1017	2·3	59	69	53	—	—	—	—	80	6·3	—	—	—	16	13	16	20	8	4	6	15	2	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	44·7	130	—	—	—	—	—	—	—	—	—	—	2	25
Extreme Values	—	—	—	—	—	—	—	104	10	—	—	—	—	7·9	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	62	57	62	38	38	62								60	30									11	17

Hourly observations. ‡Day with trace or more rain. §Based on mean hourly wind speed.

†Maximum Fall during the 24 hours from one morning observation to the next.

Authorities :—MS. data supplied by Observatoire de Zi-ka-wei.
Zi-ka-wei, Observatoire, Bulletin des Observations.

Meteorological Office, Air Ministry.

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PLACE—WEIHAIWEI. LAT. 37° 30′ N. LONG. 122° 06′ E. *Height above Mean Sea Level, 38 feet.*

METEOROLOGICAL TABLE COMPILED FROM 11-24 YEARS' OBSERVATIONS, 1899—1922.

MONTH.	PRESSURE At Mean Sea Level.		AIR TEMPERATURE.							Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN.			WIND.									No. of Days with Gales.	No. of Days with Fogs.
	Mean.		Average.	Mean (of)		Mean (of)		Extreme.				Average Fall.	No. of Days. ‡	Max. Fall in 24 hrs. †	Percentage of Observations, from										
	For Month	Daily Amplitude.		Daily Max.	Daily Min.	Highest in each month.	Lowest in each month.	Highest recorded.	Lowest recorded.						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1027	—	29	35	24	45	14	52	9	73	5	0·9	7	1·5	25	7	2	2	6	13	14	26	5	5	0·9
February	1024	—	32	39	27	50	18	58	8	76	4	0·6	5	1·7	26	9	3	4	9	10	9	23	7	4	1
March	1021	—	38	47	33	62	23	66	17	77	4	0·7	5	0·9	24	8	4	7	15	12	8	17	5	4	1
April	1015	—	50	59	43	71	33	84	29	70	5	1·2	5	1·1	16	9	7	9	17	15	9	12	6	2	3
May	1010	—	60	68	53	81	45	86	33	70	5	1·6	7	1·4	10	7	5	10	21	18	9	13	7	2	1·5
June	1005	—	69	76	62	87	54	91	38	76	6	2·3	8	3·5	9	9	9	13	22	17	5	6	10	0·3	3
July	1005	—	75	81	69	88	61	92	45	84	7	6·7	10	5·8	8	9	11	13	20	18	3	5	13	0·5	4
August	1007	—	77	83	72	89	66	91	56	82	5	4·9	10	3·7	15	13	9	11	14	10	5	8	15	0·4	2
September	1014	—	70	76	65	85	57	88	48	75	5	3·7	7	6·8	26	15	6	6	12	9	5	14	7	2	0·7
October	1019	—	61	68	55	77	45	81	37	71	4	1·5	5	1·0	26	9	3	5	14	13	8	16	6	2	0·5
November	1024	—	47	54	41	68	29	75	18	72	4	1·6	7	3·7	26	7	3	5	9	15	12	19	4	3	2·0
December	1026	—	35	41	30	53	18	59	13	74	4	1·8	6	4·5	24	5	1	2	7	14	17	26	4	3	1
Means	1016	—	53	61	48	89*	13**	—	—	75	5	—	—	—	20	9	5	7	14	14	9	15	7	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	27·5	82	—	—	—	—	—	—	—	—	—	—	28	19
Extreme Values	—	—	—	—	—	—	—	92	8	—	—	—	—	6·8	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	12–13	—	12–13	11	12–13	11	12–13	11	12–13		—	24	12–13	13	12–13									12–13	

Hours of observation, 0200, 0600, 1400 and 1800.

†Maximum Fall during the 24 hours from one morning observation to the next.

‡Day with 0·01 in. or more rain.

*Mean of highest each year. **Mean of lowest each year.

Authorities—Brooks, Q.J.R. Met. Soc., Vol. XLV, No. 189.
MS. Returns, 1917-22.

Meteorological Office, Air Ministry.

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PLACE—CHEFOO. LAT. 37° 34′ N. LONG. 121° 30′ E. *Height above Mean Sea Level, 75 feet.*

METEOROLOGICAL TABLE COMPILED FROM 22-25 YEARS' OBSERVATIONS, 1905-1930.

MONTH.	PRESSURE At Mean Sea Level. Mean For Month	PRESSURE At Mean Sea Level. Mean Daily Amplitude.	AIR TEMPERATURE Average.	Mean (of) Daily Max.	Mean (of) Daily Min.	Mean (of) Highest in each month.	Mean (of) Lowest in each month.	Extreme Highest recorded.	Extreme Lowest recorded.	Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN Average Fall.	RAIN No. of Days. ‡	RAIN Max. Fall in 24 hrs. †	WIND Percentage of Observations, from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm	No. of Days with Gales.	No. of Days with Fogs.
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1027	—	29	34	24	47	14	54	7	69	4·7	0·6	7	1·3	24	6	4	4	12	16	17	16	1	—	0·8
February	1026	—	31	37	25	53	16	64	9	67	4·2	0·4	4	1·0	24	9	5	3	12	13	15	17	2	—	0·7
March	1022	—	39	47	33	68	23	83	18	63	4·5	0·6	5	0·8	19	11	8	6	16	14	10	14	2	—	2
April	1016	—	51	61	45	82	33	92	29	61	4·6	1·0	5	1·5	12	10	9	7	21	16	12	11	2	—	2
May	1011	—	62	72	55	90	46	103	38	65	5·0	1·6	6	1·9	8	9	11	9	24	16	10	11	2	—	2
June	1006	—	70	80	64	94	56	102	52	73	5·5	2·1	7	2·6	6	11	14	11	27	14	7	7	3	—	1
July	1005	—	76	84	71	95	64	104	60	83	6·4	5·8	13	4·5	4	11	15	17	31	9	5	4	4	—	2
August	1007	—	77	84	72	93	66	100	62	82	5·5	4·9	11	3·4	13	14	12	12	19	10	7	9	4	—	0·5
September	1014	—	70	76	65	87	56	95	53	73	5·2	3·5	8	7·5	21	14	8	7	17	13	9	9	2	—	0·1
October	1020	—	60	67	54	79	43	85	35	67	4·1	1·1	6	1·3	22	10	5	5	19	16	11	11	1	—	0·5
November	1024	—	46	53	40	68	28	79	17	66	4·5	1·3	7	2·0	20	7	4	4	16	19	16	13	1	—	0
December	1027	—	34	40	29	53	19	60	11	67	5·1	0·9	8	1·1	21	5	3	3	13	19	19	16	1	—	0·1
Means	1017	—	54	61	48	97*	13**	—	—	70	4·9	—	—	—	16	10	8	7	19	14	12	12	2	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	23·8	87	—	—	—	—	—	—	—	—	—	—	—	12
Extreme Values	—	—	—	—	—	—	—	104	7	—	—	—	—	7·5	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	22	—	22	25	25	24–25				22					25									—	25

Hours of observation 0600, 1400, 2200, 135° E. meridian time.

†Maximum Fall during the 24 hours from one morning observation to the next.

‡Day with trace or more rain.

*Mean of highest each year. **Mean of lowest each year.

Authorities—Tokyo, Climatic Atlas of Japan, 1929.
Tokyo, Annual and Monthly Reports of the Central Meteorological Observatory of Japan.

Meteorological Office, Air Ministry.

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PLACE—TAKU. LAT. 38° 58′ N. LONG. 117° 39′ E. *Height above Mean Sea Level*, 10 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 3-18 YEARS' OBSERVATIONS 1870-84; 1904-18.

MONTH.	PRESSURE At Mean Sea Level.		AIR TEMPERATURE.							Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN.			WIND.									No. of Days with Gales.	No. of Days with Fogs.
	Mean.		Average	Mean (of)		Mean (of)		Extreme.				Average Fall.	No. of Days.	Max. Fall in 24 hrs. †	Percentage of Observations from										
	For Month §	Daily Amplitude.	§§	Daily Max.	Daily Min.	Highest in each month.	Lowest in each month.	Highest recorded.	Lowest recorded.						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January . .	1029	—	24	39	19	40	10	52	1	93	2·1	0·1	2	0·2	9	11	9	6	11	16	16	22	—	—	—
February . .	1027	—	30	39	25	45	13	64	5	91	2·5	0·2	2	0·2	7	9	20	10	14	14	11	15	—	—	—
March . . .	1023	—	41	50	33	64	22	73	15	74	2·1	1·1	3	1·0	6	10	17	16	17	13	10	11	—	—	—
April . . .	1016	—	58	68	45	79	35	100	25	66	2·9	0·5	3	1·0	5	10	19	21	11	12	9	13	—	—	—
May . . .	1009	—	68	80	56	92	50	102	44	64	2·9	1·3	5	1·1	5	8	21	21	13	14	10	8	—	—	—
June . . .	1006	—	76	82	65	98	63	107	51	69	3·1	4·0	7	3·3	4	7	17	28	18	14	6	6	—	—	—
July . . .	1004	—	77	85	71	94	69	102	61	80	4·1	5·5	10	4·5	4	10	19	27	18	10	7	5	—	—	—
August . .	1007	—	78	85	72	92	65	98	56	80	3·5	5·7	8	2·5	6	10	17	21	14	14	9	9	—	—	—
September .	1015	—	68	76	61	83	54	87	49	79	3·3	1·6	6	1·3	7	10	18	13	12	14	13	13	—	—	—
October . .	1021	—	55	67	51	74	36	83	35	78	2·6	2·1	4	2·9	5	10	11	10	13	21	15	15	—	—	—
November . .	1025	—	39	44	33	57	24	64	17	80	1·8	1·3	2	1·2	8	11	8	6	9	21	14	23	—	—	—
December . .	1028	—	28	33	18	43	11	50	0	91	1·6	0·1	1	0·2	10	12	11	4	7	20	13	23	—	—	—
Means . . .	1017	—	53	62	46	99*	9**	—	—	79	2·7	—	—	—	6	10	16	15	13	15	11	14	—	—	—
Totals . . .	—	—	—	—	—	—	—	—	—	—	—	23·5	53	—	—	—	—	—	—	—	—	—	—	—	—
Extreme Values	—	—	—	—	—	—	—	107	0	—	—	—	—	4·5	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	7	—	18	3	3	8	8	9	9	8	8	3–4	18	3–4	8								—	—	—

§Based on observations at 0700, 1300, 2100. §§Mean of day. †Maximum Fall during the 24 hours from one morning observation to the next.
*Mean of highest each year. **Mean of lowest each year.

Authorities—Fritsche: The Climate of Eastern Asia.
Meteor. Zeitschrift, 1887, p. 324; 1895, p. 31.

Meteorological Office, Air Ministry.

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PLACE—TIENTSIN. LAT. 39° 09′ N. LONG. 117° 09′ E. *Height above Mean Sea Level, 21 feet.*

METEOROLOGICAL TABLE COMPILED FROM 22-26 YEARS' OBSERVATIONS. 1905-1930.

MONTH.	PRESSURE At Mean Sea Level. Mean. For Month	Mean. Daily Amplitude.	AIR TEMPERATURE. Mean (of) Average.	Mean (of) Daily Max.	Mean (of) Daily Min.	Mean (of) Highest in each month.	Mean (of) Lowest in each month.	Extreme. Highest recorded.	Extreme. Lowest recorded.	Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN. Average Fall.	RAIN. No. of Days. ‡	RAIN. Max. Fall in 24 hrs. †	WIND. Percentage of Observations, from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm	No of Days with Gales.	No. of Days with Fogs.
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.										
January	1029	—	25	33	16	45	5	54	−3	59	3·0	0·2	2	0·6	16	9	12	9	8	12	12	15	7	—	1·5
February	1027	—	29	39	21	53	9	64	−1	56	2·9	0·1	2	0·5	15	9	11	11	12	11	11	13	7	—	1
March	1022	—	41	52	31	70	20	77	13	55	3·6	0·4	3	1·4	13	9	11	16	14	12	10	10	5	—	0·2
April	1015	—	56	68	45	86	32	96	27	52	4·1	0·5	3	1·2	11	8	11	17	13	16	10	10	4	—	0
May	1010	—	67	80	56	96	45	107	38	54	4·2	1·2	5	1·3	10	9	12	18	14	15	10	8	4	—	0·2
June	1005	—	76	89	66	101	56	107	49	63	5·0	2·4	9	3·1	8	9	14	21	15	13	9	6	5	—	0·1
July	1004	—	80	90	73	101	65	109	62	75	5·5	7·4	13	4·8	6	9	15	24	14	12	7	6	7	—	0
August	1007	—	78	87	72	96	64	103	57	76	5·0	6·0	11	6·4	10	12	15	15	10	11	8	7	12	—	0·1
September	1015	—	69	79	62	89	50	92	40	69	4·1	1·7	6	2·3	12	9	11	12	14	14	9	9	10	—	0·3
October	1020	—	57	68	48	81	36	88	31	64	2·8	0·6	4	3·2	12	7	10	12	14	15	11	11	8	—	0·6
November	1025	—	40	49	33	65	20	78	10	61	2·7	0·4	3	1·1	15	9	9	7	10	14	13	14	9	—	0·9
December	1028	—	28	36	21	47	10	56	−2	57	2·4	0·2	2	0·4	17	7	8	6	8	13	15	18	8	—	0·9
Means	1017	—	54	64	45	103*	3**	—	—	62	3·8	—	—	—	12	9	12	14	12	13	10	11	7	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	21·1	63	—	—	—	—	—	—	—	—	—	—	—	6
Extreme Values	—	—	—	—	—	—	—	109	−3	—	—	—	—	6·4	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	25	—	25			24–25				22	22	25–26	22	25	22									—	25

Hours of observation 0600, 1400, 2200, 135° E. meridian time.

‡Day with trace or more rain.

†Maximum Fall during the 24 hours from one morning observation to the next.

*Mean of highest each year.

**Mean of lowest each year.

Authorities:—Tokyo, Annual and Monthly Reports of the Central Meteorological Observatory of Japan.
Tokyo, Climatic Atlas of Japan, 1929.

Meteorological Office, Air Ministry.

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PLACE—YINGKOW. LAT. 40° 40′ N. LONG. 122° 14′ E. *Height above Mean Sea Level*, 12 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 10-29 YEARS' OBSERVATIONS, 1906-1934.

MONTH	PRESSURE At Mean Sea Level		AIR TEMPERATURE							Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN			WIND									No. of Days Gales.§	No. of Days Fogs.
	Mean		Average	Mean (of)		Mean (of)		Extreme.				Average Fall.	No. of Days. ‡	Max. Fall in 24 hrs. †	Percentage of Observations, from										
	For Month	Daily Amplitude.		Daily Max.	Daily Min.	Highest in each month.	Lowest in each month.	Highest recorded.	Lowest recorded						N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January	1029	—	14	24	4	39	−11	49	−21	65	2·6	0·3	3	1·4	27	23	6	13	16	5	2	5	3	1	0·6
February	1026	—	19	29	8	42	−6	50	−24	62	3·0	0·2	3	1·6	27	18	5	12	17	7	4	7	3	1·5	0·6
March	1022	—	32	41	23	57	7	65	−9	59	4·0	0·7	5	2·5	26	12	3	9	21	11	6	10	2	3	0·2
April	1015	—	48	58	37	72	24	82	6	56	4·9	1·0	6	1·3	20	11	3	10	25	17	7	6	1	6	0·4
May	1010	—	61	71	51	82	38	88	30	59	5·2	1·9	9	2·3	15	9	3	11	26	20	8	6	2	3	0·3
June	1005	—	70	80	61	89	51	95	45	66	5·7	2·4	10	3·5	8	5	4	16	29	23	9	4	2	1	0·2
July	1005	—	77	85	69	91	62	95	54	76	6·2	6·8	13	7·2	8	7	6	18	28	20	7	3	3	0·3	0·2
August	1007	—	76	84	68	91	59	98	51	77	5·5	6·5	11	8·2	19	15	5	12	19	14	6	5	5	0·1	0·2
September	1014	—	65	75	55	84	42	91	32	70	4·3	2·9	8	5·1	22	14	5	12	19	11	6	7	4	0·1	0·3
October	1020	—	51	62	41	75	27	80	17	67	3·3	1·8	6	2·6	24	12	4	13	22	10	5	7	3	0·5	0·7
November	1024	—	34	43	24	62	8	73	−10	64	3·2	0·8	5	1·2	25	18	5	13	19	6	4	7	3	1	0·3
December	1027	—	20	29	10	44	−5	51	−19	64	2·8	0·3	4	0·5	25	20	6	14	17	6	3	6	3	1·5	0·3
Means	1017	—	47	57	38	93*	−13**	—	—	65	4·2	—	—	—	20	14	5	13	21	12	6	6	3	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	25·6	83	—	—	—	—	—	—	—	—	—	—	19	4
Extreme Values	—	—	—	—	—	—	—	98	−24	—	—	—	—	8·2	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	29	—	29			28–29				29														10	29

Observations every four hours 0200 to 2200. ‡Day with trace or more rain. §19 knots or over.

†Maximum Fall during the 24 hours from one morning observation to the next. *Mean of highest each year. **Mean of lowest each year.

Authorities:—Tokyo, Results of Meteorological Observations in Japan, 1906-10.
Tokyo, Annual and Monthly Reports of the Central Meteorological Observatory of Japan.

Meteorological Office, Air Ministry.

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PLACE—MOKUHO. LAT. 34° 37′ N. LONG. 126° 23′ E. *Height above Mean Sea Level, 107 feet.*

METEOROLOGICAL TABLE COMPLIED FROM 10-30 YEARS' OBSERVATIONS.

MONTH.	PRESSURE At Mean Sea Level. Mean. For Month	PRESSURE Daily Amplitude.	AIR TEMPERATURE. Average.	Mean (of) Daily Max.	Mean (of) Daily Min.	Mean (of) Highest in each month.	Mean (of) Lowest in each month.	Extreme. Highest recorded.	Extreme. Lowest recorded.	Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN. Average Fall.	RAIN. No. of Days. ‡	RAIN. Max. Fall in 24 hrs. †	WIND. Percentage of Observations, from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales. §	No. of Days Fogs.
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January . .	1025	—	34	41	28	55	17	63	6	71	6·7	1·4	12	1·7	52	8	6	5	6	3	0	18	2	1·5	0·8
February . .	1023	—	35	43	29	56	19	66	10	70	6·5	1·5	10	1·5	53	8	4	4	5	3	1	20	2	1·5	1
March . . .	1020	—	41	50	35	65	26	72	20	70	6·1	1·6	10	1·8	43	5	4	5	10	7	2	22	2	2	2
April . . .	1016	—	52	62	45	73	36	78	30	75	6·1	3·7	10	3·7	31	5	5	7	18	11	2	19	2	1	3
May . . .	1012	—	62	70	55	80	46	82	42	77	6·2	3·6	9	7·4	22	3	4	7	23	14	5	20	2	0·2	3
June . . .	1007	—	69	77	63	85	57	90	54	82	7·4	5·6	12	4·5	16	5	5	8	24	16	6	17	3	0	4
July . . .	1007	—	76	83	71	91	65	95	59	86	7·6	8·7	15	7·9	9	4	5	8	40	18	4	9	3	0·6	4
August . .	1007	—	79	87	74	93	68	99	63	82	6·3	6·5	12	6·1	15	7	9	9	25	15	5	12	3	0·2	0·9
September .	1013	—	71	80	65	88	56	91	47	77	6·2	4·6	10	4·9	35	12	9	7	11	7	2	15	2	0·4	0·9
October . .	1019	—	61	70	54	79	44	83	38	73	5·0	2·0	8	3·1	43	10	7	5	9	5	2	17	2	0·3	0·4
November . .	1022	—	49	58	42	70	31	78	23	72	5·6	1·7	11	1·9	44	9	7	6	10	5	2	15	2	0·9	0·5
December . .	1024	—	39	46	33	60	21	66	12	71	6·6	1·5	13	1·3	51	11	5	4	6	3	1	16	3	2	0·7
Means . . .	1016	—	56	64	49	—	—	—	—	75	6·4	—	—	—	34	7	6	6	16	9	3	17	2	—	—
Totals . . .	—	—	—	—	—	—	—	—	—	—	—	42·4	132	—	—	—	—	—	—	—	—	—	—	11	21
Extreme Values	—	—	—	—	—	—	—	99	6	—	—	—	—	7·9	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	30	—	30																					10	30

Hours of observation 0200, 0600, 1000, 1400, 1800, 2200, 135° E. meridian time. ‡Day with trace or more rain. §29 knots or over.
†Maximum Fall during the 24 hours from one morning observation to the next.

Authorities:—MS. data supplied by the Meteorological Observatory, Zinsen.
Zinsen, Results of Meteorological Observations in Tyôsen, Lustrums, 1921-25, 1926-30.

Meteorological Office, Air Ministry.

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PLACE—CHEMULPHO. LAT. 37° 29′ N. LONG. 126° 38′ E. *Height above Mean Sea Level*, 231 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 10-30 YEARS' OBSERVATIONS.

MONTH.	PRESSURE At Mean Sea Level. Mean. For Month	Mean. Daily Amplitude.	AIR TEMPERATURE. Average	Mean (of) Daily Max.	Mean (of) Daily Min.	Mean (of) Highest in each month.	Mean (of) Lowest in each month.	Extreme. Highest recorded.	Extreme. Lowest recorded.	Relative Humidity.	Cloud Amount Scale 0 to 10.	RAIN. Average Fall.	RAIN. No. of Days. ‡	RAIN. Max. Fall in 24 hrs. †	WIND. Percentage of Observations, from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales. §	No. of Days Fogs.
	mb.	mb.	°F	°F	°F	°F	°F	°F	°F	%		in.		in.											
January . .	1026	—	25	33	19	46	5	55	−6	67	4·3	0·8	7	2·3	27	14	9	9	7	3	6	24	1	0·4	1·5
February . .	1024	—	28	36	22	50	9	60	−1	65	4·4	0·7	5	2·4	22	14	6	6	6	7	9	29	1	0·7	1
March . . .	1021	—	37	45	31	60	19	71	7	65	5·0	1·2	6	4·9	18	10	6	6	11	11	14	24	0	0·8	3
April . . .	1016	—	49	58	42	71	33	81	28	70	5·5	2·6	8	2·6	11	9	6	8	15	17	16	17	1	0·2	4
May . . .	1012	—	59	67	52	79	45	88	38	74	5·9	3·3	9	3·0	8	7	5	8	19	23	18	11	1	0	6
June . . .	1007	—	67	76	61	85	54	92	48	79	6·7	3·9	9	3·9	7	7	7	8	17	25	17	10	2	0·2	8
July . . .	1007	—	74	81	69	90	62	96	57	85	7·4	10·9	15	7·7	5	8	9	10	19	26	13	8	2	0·5	10
August . .	1007	—	77	84	71	92	64	98	60	81	6·4	8·8	12	13·7	9	14	14	10	12	15	14	10	2	0·1	3
September .	1013	—	68	76	61	85	52	90	42	74	5·6	4·3	9	5·0	17	21	12	8	6	8	11	15	2	0·3	1
October . .	1019	—	57	66	50	76	38	83	30	69	4·3	1·6	7	2·8	19	15	9	8	7	8	12	21	1	0·2	0·9
November . .	1023	—	43	51	36	65	21	72	13	67	4·4	1·6	9	2·4	21	14	10	11	9	4	9	21	1	1	0·9
December . .	1025	—	30	37	24	52	8	58	−1	66	4·5	1·1	9	1·0	28	16	10	10	6	2	6	21	1	0·4	1
Means . . .	1017	—	51	59	45	—	—	—	—	72	5·4	—	—	—	16	12	9	9	11	12	12	18	1	—	—
Totals . . .	—	—	—	—	—	—	—	—	—	—	—	40·8	105	—	—	—	—	—	—	—	—	—	—	5	40
Extreme Values	—	—	—	—	—	—	—	98	−6	—	—	—	—	13·7	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	30																							10	30

Hours of observation 0200, 0600, 1000, 1400, 1800, 2200, 135° E. meridian time.
†Maximum Fall during the 24 hours from one morning observation to the next.
†Day with trace or more rain.
§29 knots or over.

Authorities:—MS. data supplied by the Meteorological Observatory, Zinsen.
Zinsen, Results of Meteorological Observations in Tyôsen, Lustrums 1921-25, 1926-30.

Meteorological Office, Air Ministry.

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APPENDIX IV.

List of Spots Suitable for Magnetic Observations.

Place	Approximate position	Description.
SWATOW	Lat. 23° 21′ N. Long. 116° 40′ E.	Close re-occupation of C.I.W. station of 1906: near the water front on the northern bank of the river, in the compound of the English Presbyterian Mission and almost opposite the front porch of the middle one of three mission residences in line, facing the water front; marked by a circular block of granite, with the top inscribed "C.I.W. 1917", and left 10 inches above the surface of the ground. Near end of curve of roof of large building ..... 056° 02′, distant half a mile. Near gable end of roof of detached mission residence 088° 29′, distant about 150 feet. S.E. corner of east chimney of the Principal's house 135° 18′, distant about 120 feet. Bottom of west side of porch of middle house of three 164° 01′.
AMOY	Lat. 24° 26′ N. Long. 118° 04′ E.	Exact re-occupation of C.I.W. station of 1906: in the south corner of the lawn of the British Consul's residence on Kulangseu island; marked by a granite cylinder 18 inches in diameter, projecting 8 inches above the ground, on top of which is a brass plate giving the latitude and longitude as previously determined. Top of pagoda on mountain ..... 003° 59′, distant about 5 miles. West corner of Consul's residence ..... 152° 35′ East corner of Consul's residence ..... 195° 14′. Bottom of right side of flagstaff ..... 238° 00′.
PORT OF SAN-TU-AO	Lat. 26° 38′ N. Long. 119° 40′ E.	On the lawn in front of the Custom house and roughly in line with its south-western side; marked by a granite block having "C.I.W. 1917" inscribed on two sides, projecting about 6 inches above the ground. West boundary stone of Custom's grounds..... 094° 32′, distant about 200 feet. Bottom of Custom's flagstaff ..... 172° 11′. Bottom of tide guage ..... 357° 10′, distant about 1000 feet. Right gable of upper of two grey houses at base of conical mountain ..... 245° 58′, distant about half a mile.

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LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.—*continued.*

Place	Approximate position	Description.
NINGPO	Lat. 29° 53′ N. Long. 121° 33′ E.	Close re-occupation of C.I.W. station of 1906: northward of the foreign concession at the western end of the recreation ground of the English Methodist College; marked by a stone block, with a cross indicating the exact centre, left just below the surface of the ground. Top of steeple of St. Paul's church ..... 033° 56′, distant three-quarters of a mile. Ball on centre gable of Industrial School..... 230° 02′, distant two cables. Cross on Roman Catholic church ..... 333° 45′, distant about 3¼ cables.
YINGKOW	Lat. 40° 40′ N. Long 122° 13′ E.	Exact re-occupation of C.I.W. station of 1907: on garden property of B. C. Carlos; marked by a granite stone with a cross cut in the top face to mark the exact spot. Cross on steeple of St. Nicholas church..... 094° 02′, distant half a mile. N.E. turret of Roman Catholic church .... 117° 50′, distant half a mile. Lowest visible portion of Custom's flagstaff 125° 56′, distant half a mile.

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APPENDIX V.

Anchorages between Fokai point and Shanghai, where shelter can be obtained by vessels of moderate draught during the north-east monsoon.

Anchorage	Approximate distance from Hong-Kong.	Approximate distance from last-named anchorage.	Remarks.
	By in-shore track.		
	Miles.	Miles.	
Goat island, Tsiech point	75	—	Fair anchorage.
Chilang point. . . .	83	9	Good anchorage
Chino bay	98	15	Good shelter, but some swell.
Kupchi road	115	20	Fair anchorage, but with heavy swell occasionally from southward.
Tungao road	128	18	Fair anchorage, but with heavy southerly swell.
Breaker point . . .	134	7	Fair anchorage.
Haimung bay . . .	154	20	Fair anchorage, but Hope bay is preferable.
Hope bay	160	10	Secure anchorage.
*Clipper road, Namoa island	180	20	Secure anchorage.
Challum bay	193	13	Good anchorage.
Owick bay	202	18	Fair anchorage, but should not be used during typhoon months.
Bell island	205	3	Fair anchorage, but open to the swell.
*Tongsang harbour . .	220	15	Secure anchorage.
Tagau point	235	16	Fair anchorage, but open to heavy swell.
Red bay	243	9	Fair anchorage for small vessels.
Lim chin su or Notch island	257	14	Temporary shelter only.
Tingtai bay	262	5	Fair anchorage for small vessels.
Liau lu bay	282	21	Fair anchorage; a heavy swell with strong north-east monsoon.
Huitow bay	295	14	Good anchorage.
Meichow wan . . .	338	44	Good anchorage.
*Singhwa wan . . .	373	—	Secure anchorage.
Kerr island, Singhwa channel	373	20	Good anchorage.

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Anchorages between Fokai point and Shanghai, where shelter can be obtained by vessels of moderate draught during the north-east monsoon.—*continued.*

Anchorage.	Approximate distance from Hong-Kong.	Approximate distance from last-named anchorage.	Remarks.
	By in-shore track.		
Station island, Hai tan strait	381	8	Good anchorage.
Matsu ou	430	50	Secure anchorage.
Huying shan or Double Peak island . . .	456	26	Good anchorage.
*Little pass, Angle island	460	24	Secure anchorage. Typhoon anchorage for one vessel.
*Namkwan and Pikwan harbours	500	27	Secure anchorage.
Taepi islands. . . .	540	40	Sheltered anchorage for small vessels.
*Hei niu wan	550	58	Secure anchorage.
*Lo ching wan . . .	570	30	Good anchorage.
Taluk island	573	24	Good anchorage.
*Taichow islands . . .	610	22	Good anchorage.
Chu su	622	15	Good anchorage.
Shih pu road . . .	664	14	Indifferent anchorage.
Chiu shan lieh tao . .	670	22	Good anchorage.

NOTE.—In the in-shore passage between Futo island and Shanghai, the north-east monsoon has but little force; the great rate of the tidal streams must be guarded against.

*Typhoon harbour.

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NOTE.—Owing to the fact that most Chinese and Japanese geographic names are generally more or less of a descriptive character, and consist of two or more words which may or may not be connected by hyphens, the names in this Index are compiled in the alphebetical order they would appear under if the said names consisted of only one word. This is irrespective of whether the last word in the name is the Chinese or Japanese equivalent of a geographic term or not.

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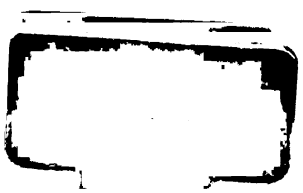

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